2008 Annual Report of NWT WILDLIFE RESEARCH PERMITS

Photo Credit: John Nagy

Northwest Territories Environment and Natural Resources

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2008 Annual Report of

NWT WILDLIFE RESEARCH PERMITS

Under the *Wildlife Act* (section 24), a valid Wildlife Research Permit is required to study wildlife or wildlife habitat in the Northwest Territories (NWT). It is an offence to conduct a survey or census of wildlife or wildlife behaviour, administer drugs, collect or purchase specimens, or carry out any scientific research relating to wildlife without a permit.

The Department of Environment and Natural Resources (ENR) is responsible for issuing Wildlife Research Permits. Each year, researchers carry out studies on all types of wildlife and wildlife habitat, throughout the NWT. As a requirement of an NWT Wildlife Research Permit, researchers must submit a summary report of their activities and findings to ENR. These summary reports are published each year in an annual report.

This publication provides summary reports for wildlife research carried out during 2008. It is the first in a series of annual reports that will report on wildlife related research being carried out in the NWT. Contact information for the main investigator leading each project has been included if you wish to obtain more information on a specific project. For more information on Wildlife Research Permits, please go to www.enr.gov.nt.ca or contact your local Environment and Natural Resources office.

Photo Credit: Leslie Bell

Amphibian and Amphibian Pathogen Survey in the Dehcho, Northwest Territories

Period: June 2008 to July 2008

Main Investigator: Danna Schock, Keyano College

Wildlife Research Permit Number: WL004775

LOCATION:

Fort Liard, Nahanni Butte, and Fort Simpson, including surrounding areas; Yohin Lake in Nahanni National Park Reserve.

RATIONALE:

This project will increase our monitoring efforts for western toads, northern leopard frogs, boreal chorus frogs, wood frogs, and long-toed salamanders. The project will provide recent data for the development of NWT management plans under *Species at Risk Act* (SARA) for northern leopard frogs and western toads. It will also provide information on the potential presence of disease and infections, and provide information on landscape change and environmental degradation of some of NWT's southern wetlands.

Work proposed for 2008 is informed by the amphibian and amphibian pathogen results from 2007, which was the first of its sort in the NWT. Results from the 2007 study suggested the presence of northern leopard frogs in the Fort Liard area, and also detected two pathogens implicated in global amphibian declines, including at a western toad breeding site. Work for 2008 is focused in the Dehcho and is designed to better understand the population ecology of amphibians and their pathogens in this ecologically distinctive area.

OBJECTIVES:

To track known populations of amphibians and find new populations of amphibians in the NWT, expanding on the survey conducted in June and July 2007;

To improve understanding of the diversity, distribution and abundance of amphibians in the Dehcho and Sahtu regions;

To collect current data on western toad and northern leopard frog populations in the NWT for the development of management plans under the federal *Species at Risk Act*;

To provide information on rare species for work done under the Protected Areas Strategy by confirming presence in proposed protected areas in the Dehcho;

To provide information on the distribution and diversity of disease agents in NWT populations of amphibians. Two pathogens are of particular concern, chytrid fungus and ranaviruses, because they are implicated in amphibian declines elsewhere in North America and world-wide. Both of these pathogens were detected in amphibian tissue samples from the Dehcho in 2007;

To collect tissues for future population genetic analyses to improve understanding of how amphibians use the landscape; and

To increase awareness about NWT amphibians.

METHODS:

Amphibian surveys will involve listening and looking for amphibians while walking transects through apparently suitable habitats. Efforts spent searching for amphibians will be quantified in terms of the time spent per transect or location.

All amphibians seen or heard will be recorded in as much detail as possible and efforts will be made to capture all amphibians encountered. Processing will involve measuring the animal's length and weight, "swabbing" the animals, and then collecting one hind-toe from metamorphosed animals, or a small (>10mm) piece of tail tip from tadpoles.

RESULTS AND MAIN CONCLUSIONS:

Environment and Natural Resources Manuscript Report 206, *Amphibian Population and Pathogen Surveys in the Dehcho and Sahtu, Northwest Territories, 2007 and 2008.*

Website: www.enr.gov.nt.ca

LONG-TERM PLANS AND RECOMMENDATIONS:

Environment and Natural Resources Manuscript Report 206, *Amphibian Population and Pathogen Surveys in the Dehcho and Sahtu, Northwest Territories, 2007 and 2008.*

Website: www.enr.gov.nt.ca

PARTNERS:

Environment and Natural Resources

Nahanni National Park Reserve

Arizona State University

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Comparative Phylogeography of Boreal Forest Birds

Period: June 24, 2008 to August 31, 2008

Main Investigator: Rebecca Carson, PhD student and Marjorie Barrick, Museum of Natural History

Wildlife Research Permit Number: WL005610

LOCATION:

Fort Liard, Hay River, and Yellowknife vicinities.

RATIONALE:

Based on genetic data, it can be determined how boreal avifauna responded to glacial maxima (e.g. putative refugia) and independent lineages can be identified. By comparing the genetic data from this study with other studies of boreal forest organisms (e.g. black spruce), it can be determined if boreal forest codistributed organisms share a common biogeographical history to Quaternary glacial events. In addition, understanding how boreal avifauna responded to past glacial events, evolutionary biologists and wildlife managers may possibly predict how boreal biotia will respond to global warming.

OBJECTIVES:

To conduct a comparative phylogeographic analysis of boreal bird species; and

To discern if those species track the biogeographical history of their habitat.

METHODS:

Collect 10 individuals of each target species from the NWT.

Laboratory work to obtain DNA sequence for analysis.

Analyses based on DNA sequence to determine if taxa possess population structure as well as to identify putative refugia and independent lineages.

Compare the results of this study with similar analyses based on other widespread boreal forest organisms and determine if codistributed taxa share a common biogeographic history in response to Pleistocene glacial events.

Results will be submitted for publication in peer-reviewed journals.

A total of 10 individuals of each species will be collected from the territory. Specimens will be collected with a shotgun and the aid of a callback. The birds will be frozen intact and shipped to the Marjorie Barrick Museum of Natural History at the University of Nevada Las Vegas. Voucher specimens will be prepared and tissue (e.g. heart, liver, and muscle) will be collected and stored at -80°C in the Marjorie Barrick Museum Frozen Tissue Collection.

RESULTS AND MAIN CONCLUSIONS:

No results or conclusions were submitted.

LONG-TERM PLANS AND RECOMMENDATIONS:

No long-term plans or recommendations were submitted.

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Cooperative Waterfowl Population Surveys in the Northwest Territories

Period: Spring 2008

Main Investigator: James S. Wortham, Chief of Waterfowl Population Surveys, United States Fish and Wildlife Service.

Wildlife Research Permit Number: WL005605

LOCATION:

The surveys cover much of the Mackenzie Valley region from the southern border of the NWT to the Mackenzie Delta region.

The NWT surveys are part of a broader program which covers much of the important waterfowl breeding habitat in North America.

Location of transects flown by small fixed-wing aircraft during annual breeding ground surveys of waterfowl in North America.

RATIONALE:

The Northwest Territories is one of the most important breeding and summering areas for ducks, geese, and swans in North America. Information on bird numbers, distribution, and population trend is needed to determine if current local and international harvest levels are sustainable, and to ensure that populations are conserved for the long-term use and appreciation by northern residents and all the other people residing within the migratory range of these species.

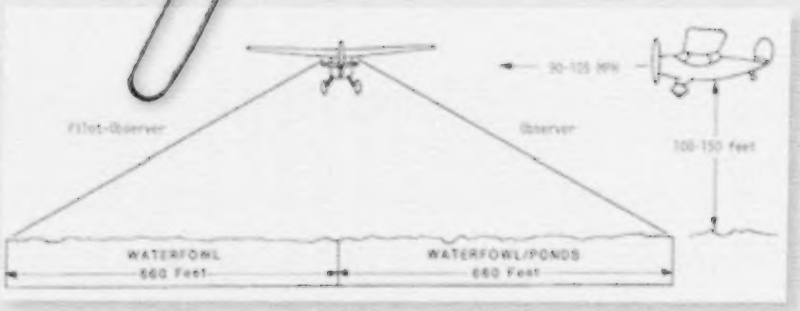
OBJECTIVES:

To determine the size and species composition of the breeding populations of ducks and other waterfowl in the Mackenzie River drainage.

METHODS:

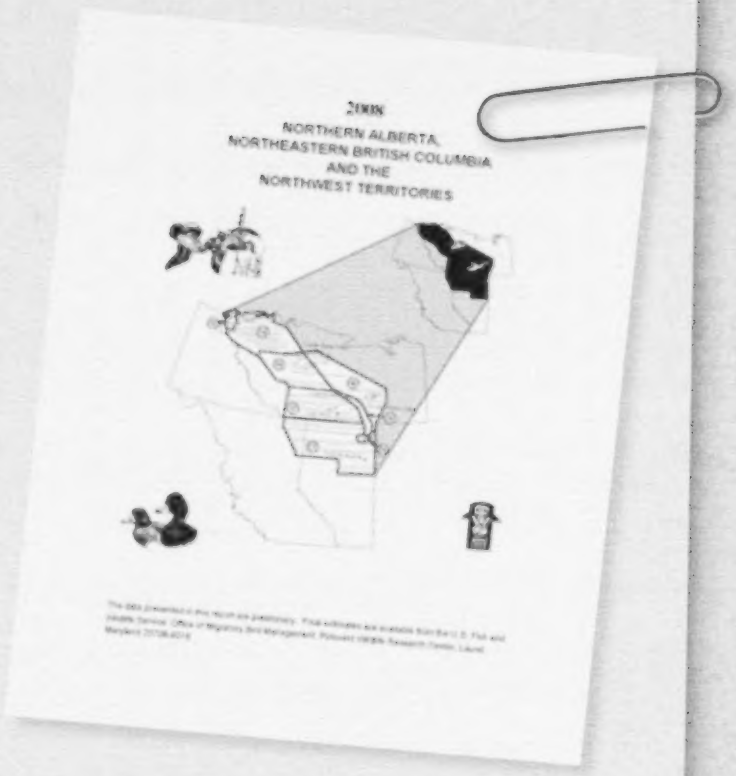
To successfully conserve and manage populations, waterfowl numbers have been monitored in the NWT annually since 1955, through low intensity surveys with a fixed-wing aircraft by the United States Fish and Wildlife Service.

Between June 1-20, 2008, 23 transects were flown in the NWT.



The survey procedure involves flying a single pass along straight transects in a single engine amphibious Cessna aircraft at a height of 150 feet. The procedures followed in conducting this survey are contained in the *"Standard Operating Procedures for Aerial Waterfowl Breeding Ground Population and Habitat Surveys in North America, Section III, revised 1987"* document.

Two observers record all waterfowl species observed within 200 m (or 600 feet) on each side of the aircraft. All observations are geo-referenced and can later be summarized at transect, strata, provincial / territorial and continental levels.



RESULTS AND MAIN CONCLUSIONS:

Total duck numbers were up from 2007 (19.2%). Dabblers were up (25.6%), divers were up (17.1%), and miscellaneous species were slightly up (0.8%).

A waterfowl over flight into the boreal forest region occurred in 2008. A much higher number of "prairie ducks" were observed throughout northern Alberta and the southern portion of the NWT.

The Mackenzie River Valley and adjacent drainage opened up rather late, with possible adverse effect on early waterfowl nesters. Virtually all the waterfowl habitat in the NWT was rated as "Good".

Waterfowl production should be up from last year for all waterfowl. However, dabbler production, especially early nesters, may be down somewhat because of the late spring. Production of divers should be similar to 2007, with the exception of canvasback and goldeneye, which should be down.

For a more detailed account of the 2008 surveys, go to http://www.fws.gov/migratorybirds/newsreportpublications/WPS/Reports08/nwt.pdf

LONG-TERM PLANS AND RECOMMENDATIONS:

The waterfowl population survey program has evolved into the largest and most reliable wildlife survey effort in the world. For more than 50 years, cooperative waterfowl surveys have been performed by United States Fish and Wildlife Service (USWFS), Canadian Wildlife Service (CWS), state and provincial biologists and non-government partners. Survey results determine the status of North America's waterfowl populations, play an important role in setting annual waterfowl hunting regulations, and help guide the decisions of waterfowl managers throughout North America.

These surveys are to continue until a more cost effective way is discovered to manage the North American waterfowl population.

PARTNERS:

United States Fish and Wildlife Service (USFWS)

Canadian Wildlife Service (CWS)

COMMUNITY INVOLVEMENT:

CWS has reviewed all concerns and comments provided by the communities and discussed solutions directly with them. The main concerns received by the communities are opportunities for local hiring and disturbance of wildlife. The USFWS is unable to hire local help because of liability and legal issues, as well as constraints in the United States civil service hiring regulations. There are relatively few transects flown over a vast area once a year. It is expected that the surveys will have a negligible effect on waterfowl and other wildlife.

CONTACTS:

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Photo Credit: R. Gore

Aerial Waterfowl Survey on Western Banks and Victoria Islands, 2008

Period: June 14, 2008 to July 31, 2008

Main Investigator: Robert MacDonald, United States Fish and Wildlife Service

Wildlife Research Permit Number: WL005587

LOCATION:

Western Banks Island and Western Victoria Island. The nearest communities will be Sachs Harbour and Ulukhaktok.

RATIONALE:

The Canadian Arctic is an important breeding area for several species of waterfowl, e.g. Canada geese, mid-continent white-fronted geese, common eiders, king eiders, and long-tailed ducks. The population status and trends of these arctic-nesting species have historically been monitored via programs established on wintering areas or at points along migration routes with little or no information collected on breeding grounds. For some species, e.g. king eiders and long-tailed ducks, quantitative information obtained to date is extremely limited and applies only to broad-scale population levels. Such a lack of information hinders the ability of managers to understand the birds' population dynamics and to identify causal factors associated with perceived changes in population sizes. Data on spatial distribution and abundance from breeding areas would greatly complement information gathered elsewhere and would allow for more effective monitoring and better-informed management decisions.

Towards this goal, biologists with the Canadian Wildlife Service (CWS), in cooperation with the Arctic Goose Joint Venture and the Sea Duck Joint Venture, flew helicopter surveys in 2004-2005 to collect baseline data from important waterfowl breeding areas in western Victoria Island, which replicated similar surveys established in 1992-1994.

In 2008, we plan to repeat some of the transect lines that have been flown in recent years by CWS and to add additional transect lines on western Banks Island. This data will allow us to improve current estimates of population size and distribution for each species surveyed, and it will further assist wildlife managers in developing a long-term monitoring plan for breeding waterfowl populations in the central Canadian Arctic.

OBJECTIVES:

To obtain population-size estimates and distribution information for waterfowl and other bird species within the defined study areas to assist in a long-term population trend monitoring program; and

To gather essential data to assist wildlife managers in planning efforts for a long-term monitoring plan for birds in the Canadian Arctic.

METHODS:

A 2-3 person survey crew will base out of Sachs Harbour and Ulukhaktok between June 14th and July 3rd to fly an aerial waterfowl survey using a turbine-powered de Havilland Beaver on amphibious floats. These aerial surveys will document all ducks, geese, swans, and cranes using standard methodology for aerial surveys of waterfowl. Transects of varying length spaced 10 km apart will be flown at an altitude of 35-45 m and an air speed of 155 kph. Each transect will be flown once. The pilot

observer and right seat observer will each record birds observed within a distance of 200 m from the flight path using onboard computers interfaced with the aircraft's GPS unit to capture the species and number and location of each observation. Data will later be transcribed, summarized, and incorporated into maps showing distribution by species. We will use available lodging and eating accommodations in towns and will not need to establish a camp.

RESULTS AND MAIN CONCLUSIONS:

No results or main conclusions submitted.

LONG-TERM PLANS AND RECOMMENDATIONS:

No long-term plans or recommendations submitted.

CONTACTS:

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Western Canada Cooperative Waterfowl Banding Program – Stagg River Station

Period: August 1, 2008 to September 1, 2008

Main Investigator: Carl Ferguson, Wildlife Biologist, United States Fish and Wildlife Service

Wildlife Research Permit Number: WL005665

LOCATION:

Stagg River delta, approximately 13 miles southeast of Behchokǫ̀, NT.

METHODS:

Waterfowl were caught using modified Benning (B-2) traps. The Benning B-2 traps were used at three trapping locations; located at the southeast end of the marsh and at the rock, which had been extensively used in the past.

RESULTS AND MAIN CONCLUSIONS:

A total of 11 B-2 traps were used over the course of the trapping period. This resulted in 93 trap nights for a total of 475 birds being captured. The total numbers of birds comprised 330 mallards, 125 American green winged teal, and 20 northern pintail. The majority of the birds captured were after hatch-year (AHY) birds with few hatch-year (HY) birds, possibly indicating a poor breeding season. There was one case of trap mortality throughout the whole of the trapping season, which was thought to be caused by mink.

LONG-TERM PLANS AND RECOMMENDATIONS:

Long-term plans and recommendations were not submitted.

PARTNERS:

Canadian Wildlife Service

United States Fish and Wildlife Service

COMMUNITY INVOLVEMENT:

Local individuals have been used as local guides and biological technicians. Local school-aged children were brought to the banding location to educate them in waterfowl banding techniques and in possible wildlife career opportunities.

CONTACTS:

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Photo Credit: John Nagy

Western Canada Cooperative Waterfowl Banding Program Mills Lake, NT

Period: August 3-27, 2008

Main Investigator: David Fronczak, Wildlife Biologist, United States Fish and Wildlife Service

Wildlife Research Permit Number: WL004765

LOCATION:

Mills Lake, NT (roughly 21 miles NNW of Ft. Providence, NT, along the Mackenzie River).

RATIONALE:

Pre-hunting season waterfowl banding at Mills Lake, NT has been an ongoing event since 1964. During the 40 years of operations, approximately 88,000 waterfowl have been banded. Recovery information is used to help determine migration routes, assess harvest pressure, measure vulnerability to harvest pressure, estimate waterfowl production rates, and estimate survival rates of a breeding population. Mills Lake has proven to be important to the overall waterfowl population monitoring program by providing a cost effective way to sample a segment of the boreal breeding population.

OBJECTIVES:

To pre-season band 1000 mallards (of each cohort) for the combined banding effort within the Northwest Territories, Canada.

METHODS:

Surveys along the shores of the Mackenzie River and the shallow water of the inner marsh were conducted by airboat. Vegetation was cleared, using hand scythes and rakes, to create 12' x 12' trap sites. These sites were then baited with barley and marked with a GPS. Benning shallow water traps were put in place after evidence of use was observed (missing bait, feathers, etc.).

Nine trap sites were created along the eastern edge of the Mackenzie River and western central portion of the marsh. Depths averaged between 7 and 10 inches. Between August 8th and 26th, 193 trap nights were achieved.

RESULTS AND MAIN CONCLUSIONS:

The final tally for banded ducks in 2008 was 2,787 including 918 mallards, 1787 northern pintails, 55 green winged teal, 5 wigeon, and 22 blue winged teal. Percentage of young to after hatched year birds totalled 20% and 16% for mallard and northern pintail, respectively, which indicate lower production for the area than in the past. In addition, 12 mallard and one blue winged teal duckling were captured. The crew captured 75 previously banded ducks consisting of 56 northern pintail and 19 mallard. Fifty-five birds were initially caught on the 9th and captures then averaged 160/day for the rest of the month. The amount of recaptured birds to new birds increased around the 14th and stayed consistent until the end of the operation. One trap site was closed for two days to try to lower the presence of recaptured birds. Observations showed that bird concentrations increased around the third week as birds moved into the west central portion of the marsh.

LONG-TERM PLANS AND RECOMMENDATIONS:

In accordance with the internationally signed *Migratory Bird Treaty Act*, our long-term plans are to continue the annual preseason banding operations at Mills Lake to monitor the health and well-being of the waterfowl populations within the Northwest Territories, Canada.

COMMUNITY INVOLVEMENT:

Malewskis (Colin and Alicia) and their staff at the Aurora Market continued to provide outstanding support, advice, and friendship during the entire month of the operation. Without their assistance, operations would be absolutely difficult.

CONTACTS:

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Aerial Surveys of Waterfowl at Beaver Lake, NWT: Ecological Assessment of the Ka'a'gee Tu Candidate Protected Area

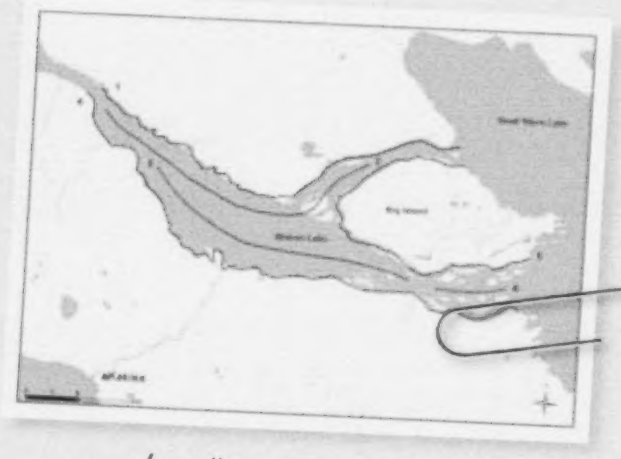
Period: Fall 2008

Main Investigator: Paul Latour, Habitat Biologist for the Western Arctic, Canadian Wildlife Service

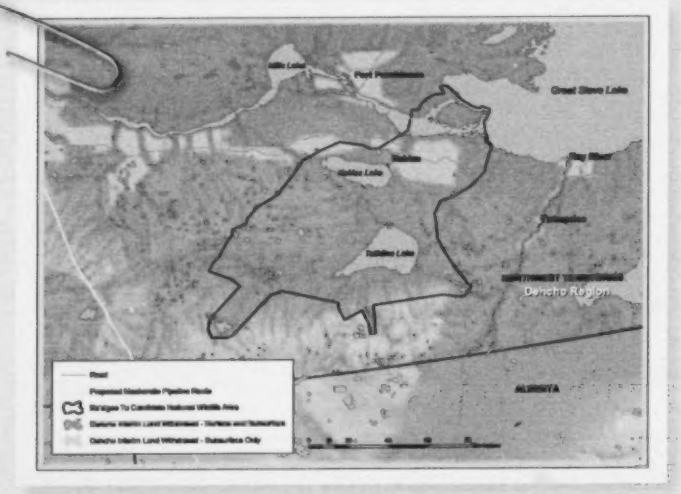
Wildlife Research Permit Number: WL004766

LOCATION:

Beaver Lake is located at approximately 61°07'N, 117°08'W within the Hay River Lowland Ecoregion. Beaver Lake is a widening of the Mackenzie River at the outlet of Great Slave Lake, separated at the east end by a large island, Big Island. The channels on the north and south ends of Big Island are spotted with many small islands which provide good habitat for waterfowl. The shoreline of Beaver Lake consists of a contiguous band of marshy areas comprising aquatic vegetation, sedges and grasses, intermixed with shrubs. Beaver Lake is a favoured resting and feeding area of swans and ducks, particularly during the spring and fall.



Location of Beaver Lake



Ka'a'gee Tu Area of Interest (map courtesy of NWT Protected Areas Strategy)

RATIONALE:

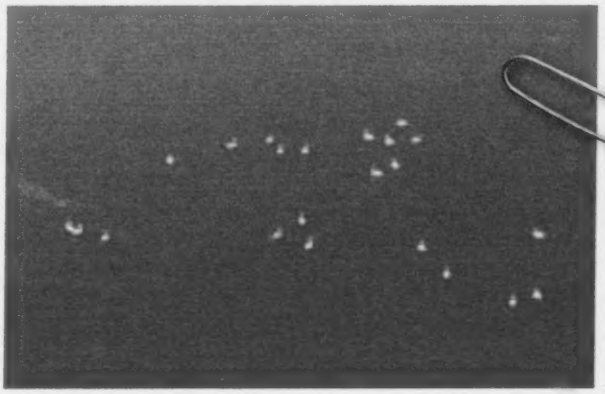
The Canadian Wildlife Service (CWS) is expecting that it will be approached by the community of Kakisa to serve as the sponsoring agency for the Ka'a'gee Tu candidate protected area. Sponsorship would mean that CWS would work with the community to advance this area through the *NWT Protected Areas Strategy* leading to legal designation under the *Wildlife Area Regulations*. In advance of this, CWS is proposing to get an initial start on the ecological assessment of Ka'a'gee Tu (as required by the *NWT Protected Areas Strategy*) by updating its information on the importance of Beaver Lake to migratory waterfowl and water birds. Beaver Lake is a CWS key migratory bird terrestrial habitat site, but this status is based on very old data.

OBJECTIVES:

To determine the size and species composition of the fall/staging populations of waterfowl and water birds at Beaver Lake, NT.

METHODS:

An assessment of staging waterfowl at Beaver Lake was done via aerial surveys using a single engine fixed-wing aircraft. Surveys were conducted with two observers, one seated in the right front seat and the other in the left rear seat. Prior to each survey, one transect of known elevation and horizontal distance was flown to calibrate distance estimation for observers. Surveys were flown every five days from August 27th to October 16th, for a total of eleven surveys.



Each aerial survey consisted of six transects which covered either shoreline or open water regions of the lake. The same transects were flown on each survey date to maintain consistency between surveys. All transects were flown at a speed of 150 km/hr and flown at a height of 60 m above the water surface.

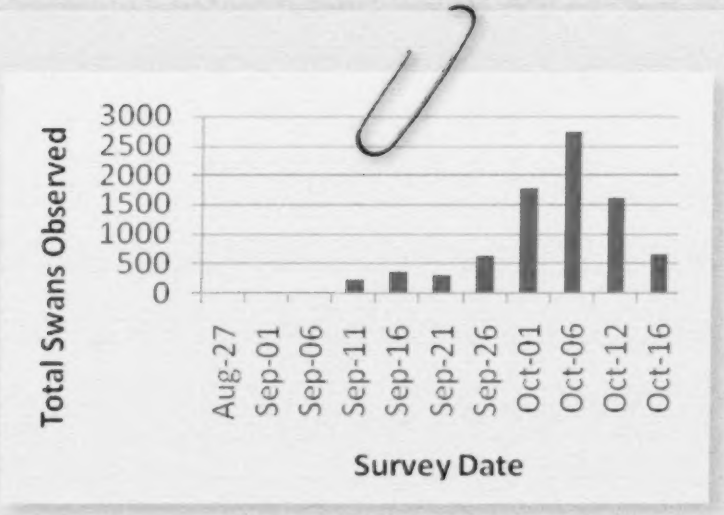
All bird observations within 250 m of the flight path were recorded. Information for each bird observation, such as time of observation, identity of the species if known, and number of birds was dictated using a voice recorder.

RESULTS AND MAIN CONCLUSIONS:

We observed a total number of 73,994 birds at Beaver Lake over the course of the survey period. This number consists primarily of waterfowl (ducks, geese, and swans), but also includes gulls, terns, raptors, shorebirds, and water birds such as loons, grebes and pelicans. Overall, approximately 40 different bird species were observed.

Diving ducks were the most abundant bird group present at Beaver Lake, with a total of 37,508 counted over the course of the survey period. Dabbling ducks were also abundant with 10,967 counted during the survey period.

A total of 8,300 swans were counted at Beaver Lake. Swans were observed during all surveys of Beaver Lake and numbers peaked on October 6th when a total of 2,725 swans, including young and adults, were observed.



Total number of swans observed on each survey date

LONG-TERM PLANS AND RECOMMENDATIONS:

Aerial waterfowl surveys at Beaver Lake will continue in 2009 but will be expanded to include the spring migration and summer moulting periods; as well as the fall staging period as was covered in 2008.

COMMUNITY INVOLVEMENT:

The communities of Kakisa and Fort Providence have been consulted on the inclusion of Beaver Lake in the Ka'a'gee Tu candidate protected area. There have been no consultations specifically on these aerial surveys; however, Kakisa and Fort Providence would form part of the protected area working group and would be consulted on all future aspects of the ecological assessment that will be required for Ka'a'gee Tu.

Aerial surveys are weight and space restricted and therefore offer limited opportunity for local participation.

CONTACTS:

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Photo Credit: B. Johns

Whooping Crane Ecology and Rehabilitation

Period: May 1, 2008 to October 31, 2008

Main Investigator: Brian Johns, Canadian Wildlife Service

Wildlife Research Permit Number: WL004764

LOCATION:

Within a 200 km radius circle centered on 60°10" Longitude 113°20" Latitude. The nearest community is Fort Smith, NT.

RATIONALE:

Whooping cranes are listed as an endangered species under the federal *Species At Risk Act*. Since 1966, the Canadian Wildlife Service and United States Fish and Wildlife Service have increased management efforts for whopping cranes, resulting in an increase in the wild population in Canada from a low of 21 birds in 1941 to the current population of 266 in 2007. In addition, surplus eggs were collected in Wood Buffalo National Park to establish a captive population which now numbers 145. Additional wild populations have been established from both captive and wild produced eggs. These additional populations represent an additional 107 birds. Additional management activities are expected to further increase the wild population.

OBJECTIVES:

To conduct breeding pair surveys;

To conduct hatching success surveys;

To conduct fledging success surveys;

To survey clutch sizes;

To record unison calls; and

To conduct food resource sampling.

METHODS:

Breeding pair counts, hatching success, chick survival, and location of non-breeding cranes and pioneering nesting pairs were conducted using a Cessna 185 and 210. Locations were plotted on aerial photographs, GPS coordinates were recorded for nests, band colours were recorded, and determination of egg laying dates and clutch size information was gathered.

Nest pond depths were measured and water samples, potential food items, faecal pellets, prey remains, evidence of moulting, dead cranes and regurgitates were collected via helicopter flights.

RESULTS AND MAIN CONCLUSIONS:

Sixty-six whooping crane pairs nested during the 2008 breeding season. Habitat conditions in the park and surrounding area were better than average during the nesting season. Summer rains were near normal resulting in average habitat conditions during the summer. At least 64 chicks successfully hatched in and adjacent to Wood Buffalo National Park and at least 41 of those survived to fledgling age.

The total number of territorial pairs (72) matches the number of territories occupied on the cranes' wintering grounds during the winter of 2007/08 (T. Stehn pers. com.). Another 17 pairs of sub-adult or non-territorial cranes were also observed scattered throughout the breeding area.

LONG-TERM PLANS AND RECOMMENDATIONS:

Monitoring and recovery activities are outlined in the Canada / United States Memorandum Of Understanding on the Conservation of the Whooping Crane (2001), recovery strategy for the whooping crane *(Grus americana)* in Canada (2007) and the *International Recovery Plan for the Whooping Crane* (2006).

PARTNERS:

Wood Buffalo National Park
United States Fish and Wildlife Service
Environment and Natural Resources

COMMUNITY INVOLVEMENT:

Chiefs and councillors of the Salt River First Nation (SRFN) were taken out on survey flights over portions of the nesting area. Meetings have been held with the SRFN regarding critical habitat for whooping cranes and options were sought on collaboration.

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10-month Calf Recruitment Survey of the Ahiak and Beverly Barren-Ground Caribou Herds

Period: March 15-31, 2008

Main Investigator: Deborah Johnson, Regional Biologist, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL004763

LOCATION:

Ahiak and Beverly barren-ground caribou range (includes communities of Lutselk'e, Fort Resolution and Fort Smith in the NT).

RATIONALE:

Surveys of yearly calf survival (at 10 months of age), measured as the proportion of calves to cows, have been used in the past as a secondary means to assess potential herd growth. Correlating increases in herd size with calf:cow ratios assumes that the rate of death of cows is low compared to calves. This assumption is likely true most of the time and may only deviate under abnormal conditions (e.g. high harvest of cows during the year). It is thought that due to the remoteness of the winter range, annual harvest of cows is relatively low compared to other barren-ground caribou herds in the NWT.

OBJECTIVES:

To measure annual calf survival with a coefficient of variation of <10%; and

To compare the trend in calf survival with earlier collected data.

METHODS:

Collars deployed on the Ahiak and Beverly herds in March 2006 and July 2007, along with existing GPS and satellite-radio collar locations of caribou from the Bathurst, Ahiak and Qamanirjuaq herds, and local knowledge from relevant NT and northern Saskatchewan communities will be used to determine areas to be surveyed. Sampling will occur across the entire survey area.

A fixed-wing reconnaissance survey may be required to determine allocation of effort in relation to the distribution and density of caribou observed, as well as the location of collared cows. A coarse grid (20 x 20 km^2 or larger) will be set up and sample effort will be allocated according to the distribution of observed cow groups and collared cows. Sampling will include grid cells with collared cows and grid cells with cow groups without collars.

Classification will take place during March or early April before cows begin migrating. A helicopter will be used to position personnel close to the groups of caribou. For large groups, caribou will be approached on foot, viewed with a spotting scope and classified as calves, cows and bulls. For smaller groups, caribou will be classified from the aircraft. Sampling effort, distributed proportionally to density, will be determined subjectively based on the number of caribou seen. Cochran's (1977) Jackknife technique will be used to calculate age and sex ratios and their associated variances on a daily basis to ensure that the required level of precision is achieved.

RESULTS AND MAIN CONCLUSIONS:

The composition survey took place from March 17-20, 2008. 11,163 caribou were classified in 296 groups. The calf:cow ratio observed was 48.2:100 (SE=1.7).

LONG-TERM PLANS AND RECOMMENDATIONS:

It is recommended that late winter composition surveys be conducted to monitor calf survival each year (Strategy #5 in the *Barren-Ground Caribou Management Strategy for the Northwest Territories 2006-2010*).

PARTNERS:

Environment and Natural Resources

COMMUNITY INVOLVEMENT:

No opportunity for direct participation by local community residents was available due to limited space in aircraft.

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2008 Delineation of Calving Grounds of Cape Bathurst, Bluenose-West and Tuktoyaktuk Peninsula Barren-Ground Caribou

Period: June 10-30, 2008

Main Investigator: Marsha Branigan, Manager Wildlife Management, Environment and Natural Resources, GNWT, Inuvik Region

Wildlife Research Permit Number: WL005589

LOCATION:

The calving areas of the Bluenose-West, Cape Bathurst and Tuktoyaktuk Peninsula barren-ground caribou herds were surveyed between June 12-25, 2008.

RATIONALE:

The survey of these herds was flown at the same time as surveys of other barren-ground caribou herds across mainland NWT and Nunavut to provide an overall picture of caribou calving in the NWT.

OBJECTIVES:

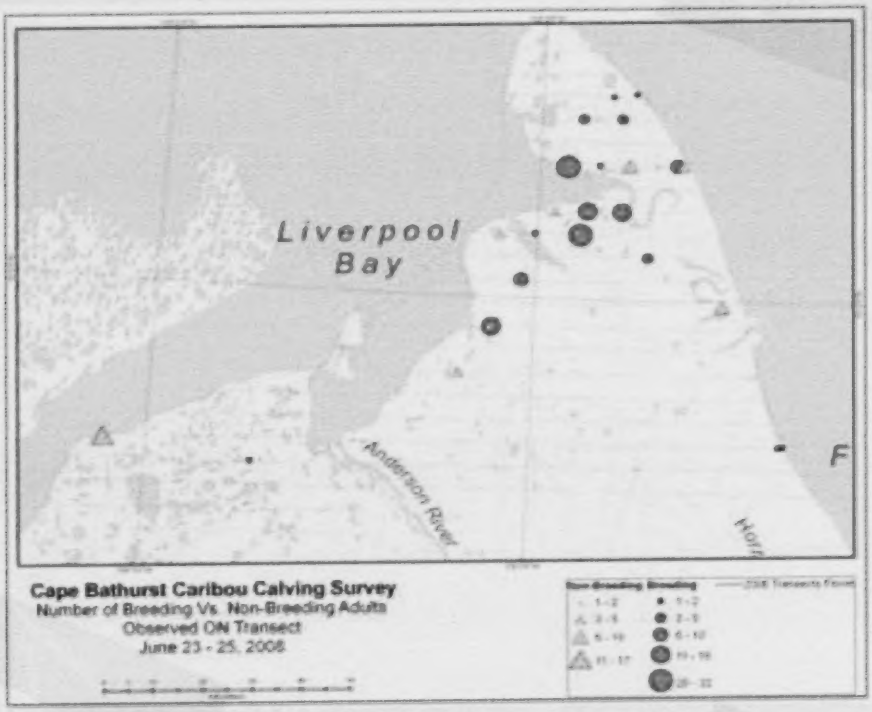
To map the distribution and density of calving barren-ground caribou.

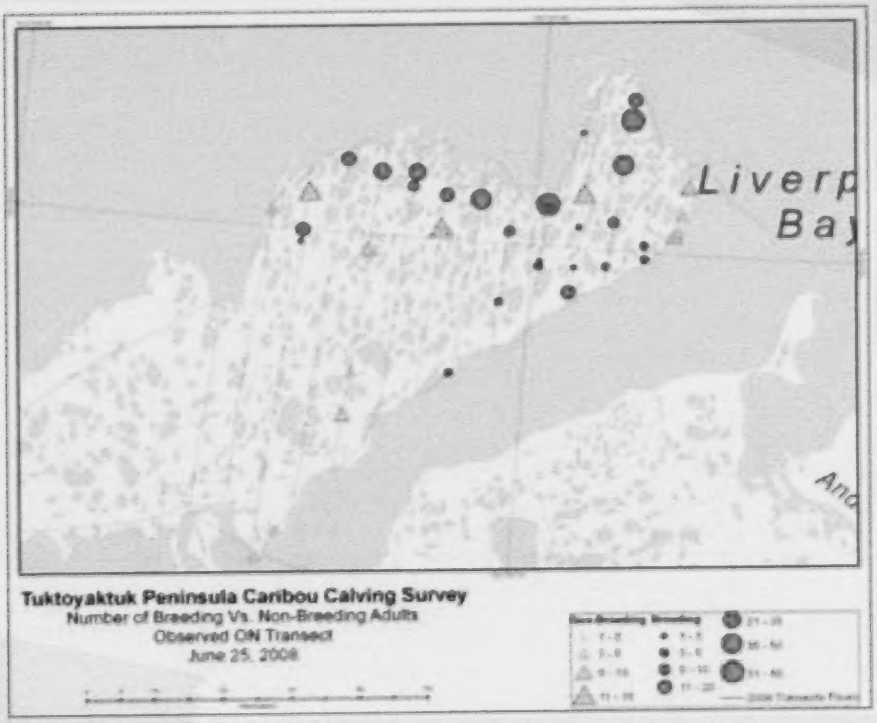
METHODS:

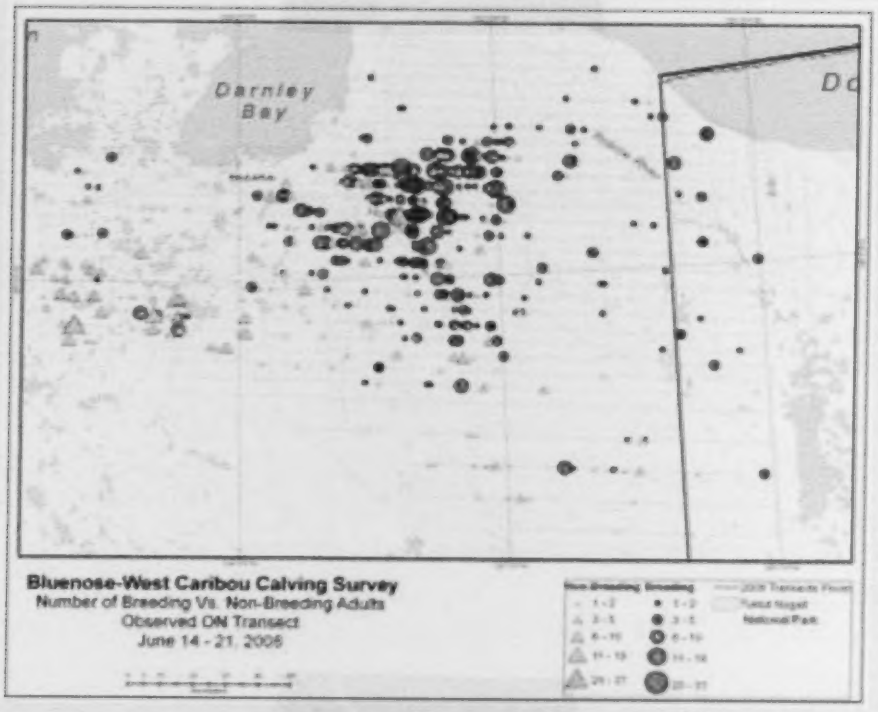
Caribou were observed from a fixed-wing aircraft, with two observers in the back, one on each side of the plane, and the pilot and recorder in the front of the plane. Parallel transect lines, spaced 5 km apart, were flown over the majority of the area. At the southern edges of the Bluenose-West herd survey areas, where numbers of caribou observed decline, lines were 10 km apart.

Caribou were classified as either adult or calf with most on-transect adult animals further identified as cow with antler, cow without antler, or bull. Breeding groups included groups with calves or cows with antlers. Location and numbers of other observed wildlife (e.g. grizzly bears, wolves, and moose) were also recorded.

RESULTS AND MAIN CONCLUSIONS:






Darnley Bay
Bluenose-West Caribou Calving Survey
Number of Breeding Vs. Non-Breeding Adults
Observed ON Transect
June 14 - 21, 2008

LONG-TERM PLANS AND RECOMMENDATIONS:

Results were combined with other surveys conducted across the NWT to map NWT calving areas. Core calving areas in 2008 were consistent with previous surveys.

PARTNERS:

Environment and Natural Resources

Parks Canada, Tuktut Nogait National Park

COMMUNITY INVOLVEMENT:

Field assistants were hired from the communities of Paulatuk, Colville Lake, Tuktoyaktuk, and Inuvik.

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Photo Credit: ENR

Greater Nahanni Caribou Population Monitoring

Period: September 2008 to October 2008

Main Investigator: Troy Hegel, Caribou Biologist, Environment, Yukon Government, YK

Wildlife Research Permit Number: WL005611

LOCATION:

From September 26th to October 4th, 2008, the South Nahanni and Coal River mountain caribou herds were surveyed during fall composition counts. Locations of observed animal groups from both herds are identified on Figure 1.

From September 30th to October 4th, 2008, 30 adult female caribou were captured (net-gun) and fitted with satellite radio-collars. Only caribou within the South Nahanni herd were fitted with collars and capture locations are identified in Figure 2.

Figure 1

RATIONALE:

The South Nahanni and Coal River mountain caribou herds are both relatively accessible, with all-season roads located within their ranges. Previous surveys and counts of the South Nahanni herd suggest that the herd may be heavily harvested, based on lower bull:cow sex ratios. The harvest rate in 2001 was estimated to be between 4-5%, which is substantially higher than the 2-3% recommended by the *Yukon Woodland Caribou Management Guidelines*. This potentially high harvest level is coupled with recruitment rates that are lower than average for other mountain caribou herds throughout the Yukon Territory. Given the concern over the population dynamics of the herd, additional yearly monitoring of population parameters is warranted to gain a more complete assessment of the herd's health, compared to what can be inferred from a single year's estimate.

Figure 2

Furthermore, information on the space use of the South Nahanni herd is relatively sparse. The South Nahanni herd is bordered by three other herds: Coal River (south), Finlayson (west), and Redstone (north). Obtaining a better understanding of how the South Nahanni herd uses the landscape will aid management, as more detailed seasonal range delineation will reduce the likelihood that caribou from other herds are included in monitoring and/or population estimation activities. Given the high amount of industrial activity occurring along the YT-NWT border, a more comprehensive understanding of landscape use by this herd may provide information to better mitigate impacts of development.

The Coal River herd has been surveyed once before in 1997 and, given the accessibility of this herd to hunters, obtaining more information on its demographic health is also warranted.

OBJECTIVES:

To estimate the composition of the South Nahanni and Coal River mountain caribou herds, specifically recruitment (calf:cow) and sex (bull:cow) ratios; and

To capture and fit with satellite radio-collars, 30 adult females from the South Nahanni mountain caribou herd.

METHODS:

Composition Counts

For both herds a helicopter was used to fly at or above the treeline, focussing on high plateaus, which are areas known to be used by mountain caribou during the rut. Routes were flown and areas were chosen to avoid double-counting of animals. When a group was observed, its composition was assessed and animals were classified into one of five categories: calves, adult female, immature male, mature male, or unclassified. Adult females were distinguished from immature males based on the presence of a dark vulva patch.

Animal Capture

Captures undertaken on the South Nahanni herd followed the fall composition count. Captures were carried out from a helicopter using a net-gun, a commonly used method for caribou captures, with a highly experienced net-gunner and pilot. Upon sighting a group of animals, an adult female was selected from the group and using the helicopter, was eased away from the rest of the group for net-gun deployment. Once restrained, she was fitted with a satellite radio-collar (Telonics model TAW4610), and other samples and measurements were collected.

RESULTS AND MAIN CONCLUSIONS:

Composition Counts

A Bell 206 helicopter was used during the South Nahanni survey. During the survey we observed 24 groups of animals, with an average group size of 10.2 animals (Range: 1 – 60). We classified a total of 245 animals. The recruitment rate for the herd was low, 9.5 calves:100 cows. This was similar to the low recruitment of 10 calves:100 cows observed in 2001. This year's sex ratio, 35.5 bulls:100 cows was slightly higher than the 2007 estimate of 33 bulls:100 cows, although not different statistically.

An A-Star (AS350) helicopter was used during the Coal River survey. This year's survey was the first since 1997. As with the South Nahanni herd, recruitment was low at 12 calves:100 cows. The sex ratio of the herd was also similar to that of the South Nahanni. This bull:cow ratio is near the minimum level of 30 bulls:100 cows recommended in the Yukon Woodland Caribou Management Guidelines, and may indicate a high harvest level. As with the South Nahanni survey, weather conditions allowed for good visibility. There was no snow on the ground in the Coal River range.

South Nahanni Animal Capture

From September 30th to October 4th, 2008, 30 adult females were captured, via net-gun, and fitted with satellite radio-collars in the South Nahanni herd. A Bell 407 helicopter was used for capture operations. Locations of captures are indicated in Figure 2. We attempted to place collars on animals representatively according to the distribution of animals across the landscape. One capture related mortality occurred in the Yukon Territory in which an animal tripped on the netting and subsequently fell, breaking its neck. The animal was dressed in the field and the meat was distributed to the Liard First Nation (Watson Lake) via the District Conservation Officer (Mark Brodhagen).

LONG-TERM PLANS AND RECOMMENDATIONS:

Satellite collars will be monitored during the next four years to provide more precise estimates of seasonal distribution and movement patterns. Next year (2009), we will use the collars deployed on the South Nahanni herd as "marks" for a mark-resight estimate of the size of the herd. During the next 2-3 years, composition counts will be carried out on both the South Nahanni and Coal River herds to provide a more accurate assessment of the condition of the herd than can be obtained with only one year's estimate. This South Nahanni herd size estimate, in conjunction with parameters collected during composition counts, will be used to assess the sustainability of the harvest at current levels.

PARTNERS:

Canadian Parks and Wilderness Society, NWT Chapter

Environment and Natural Resources

Nahanni National Park Reserve, Parks Canada Park

Establishment Branch, Parks Canada

Environment, Yukon Government

COMMUNITY INVOLVEMENT:

During both composition counts, observers from local communities participated in survey operations. During the South Nahanni survey, Darrell Betsaka (Nahanni Butte Dene Band) assisted the survey crew, and during the Coal River survey, Kevin Charlie (Liard First Nation) participated on behalf of the community. When feasible, community members will be invited to participate in future years' surveys. Results from this year's work will be presented at the upcoming Dehcho wildlife workshop in Fort Simpson (October 2008) and this report distributed to communities in both the Yukon and Northwest Territories.

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Photo Credit: Anne Gunn

Monitoring Moose Density and Distribution Along the Mackenzie and Liard Valley

Period: 2008 – 2009

Main Investigator: Nic Larter, Regional Biologist, Environment and Natural Resources, GNWT, Dehcho Region

Wildlife Research Permit Number: WL004971

LOCATION:

The aerial survey areas include the Liard River Valley and adjacent area, and the Mackenzie River Valley and adjacent area south and west from Blackwater River to Jean Marie River. Biological samples come from traditional harvesting areas from members of the local Dehcho First Nations.

RATIONALE:

Moose is an important traditional wildlife resource for residents of the Dehcho region of the NT. Moose density estimates for areas within or adjacent to major harvesting corridors and current and proposed industrial development sites were lacking. Limited moose surveys were conducted in the Dehcho in the mid 1980s in relation to the new Liard Highway. One survey was conducted in the Liard Valley in 1994. Moose in the Dehcho continue to be a highly sought after traditional food by both local residents and hunters residing in other regions of the NT. Hunting pressure on moose has increased since the last surveys, and concerns that moose numbers appear to be depressed have been voiced by local First Nations throughout the Dehcho region. These concerns, combined with increasing oil and gas activity in the Liard and Mackenzie River Valleys, indicated a need to assess moose populations prior to additional habitat loss and increased accessibility in the region. Being an important traditional food source, residents of the Dehcho also wanted to know the health and condition of the moose they harvest.

OBJECTIVES:

To establish baseline estimates of moose density in the Dehcho region and establish a community-based monitoring program;

To conduct annual small-scale aerial surveys for moose in areas of interest to five communities in the Dehcho region. Surveys would be conducted with the assistance of local harvesters over a multi-year period;

To provide information that can be used to determine the timing of further large-scale moose surveys in the region;

To document health and condition indices of locally harvested moose throughout the region and increase community involvement in harvesting programs; and

To document the levels of various heavy metals and other contaminants found in the organs of moose harvested as a country food source throughout the Dehcho region.

METHODS:

Traditional knowledge was used to stratify the air survey area into high and low moose density areas.

The ver Hoef geospatial method was used for large-scale moose surveys flown in the Mackenzie River Valley (November 2003) and the Liard River Valley (February 2004).

Based on the two sources of information, an annual moose monitoring program was initiated with five communities in the Dehcho region (Wrigley, Fort Simpson, Jean Marie River, Nahanni Butte, and Fort Liard).

The monitoring program consists of an aerial survey component (conducted in November) to assess moose distribution, density and calf production, and a biological sampling program component to physically assess animal health and condition.

Biological sampling has allowed documentation of the incidence of parasites and disease and documentation of levels of various contaminants in moose organs.

Sampling kits are made available and sampling protocols have been discussed with harvesters in all five communities.

RESULTS AND MAIN CONCLUSIONS:

Preliminary results, posters and summary reports have been provided to First Nations.

Preliminary results of some of the heavy metal work were presented at the 43rd North American Moose Conference and Workshop, the 15th Northern Contaminants Program Results Workshop, and the 4th biannual Dehcho regional wildlife workshop, and were used in the decision to issue a public health advisory on the consumption of moose organs.

A presentation of the entire moose monitoring program was made at the 6th International Moose Symposium, held in Yakutsk, Russia; a scientific paper of the presentation is in press.

Scientific publications, government reports and conference presentations of additional results are currently being produced and presented in a variety of formats and forums.

LONG-TERM PLANS AND RECOMMENDATIONS:

Similar aerial monitoring programs will be conducted annually each November through 2009/2010.

It is anticipated that a large-scale moose survey would be conducted in 2009/2010 or 2010/2011 unless preliminary results indicate otherwise.

Lab analyses of organs for contaminant levels has been completed. A thorough statistical analysis of contaminant levels in moose organs will continue through 2009/2010 with results being presented as analyses are completed.

A presentation about the public health advisory resulting from the cadmium levels we reported will be made at the 14th International Conference on Circumpolar Health held in Yellowknife, NT.

Basic biological sampling of harvested moose continues to be ongoing.

All biological samples collected will be stored frozen should additional analyses be required in future.

PARTNERS:

Environment and Natural Resources

Parks Canada

Dehcho First Nations

previous funding from Northern Contaminants Program.

COMMUNITY INVOLVEMENT:

Community involvement in sample collection and as survey observers. At annual community meetings and regional biannual wildlife workshops, the current status of the moose program is presented and critiqued in an open forum setting. Community concerns are raised and addressed at such meetings and the program is modified accordingly.

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Photo Credit: G. Court

Dall's Sheep, Grizzly Bear and Wolf Interactions in the Richardson Mountains

Period: June 2008 to October 2008

Main Investigator: Catherine Lambert Koizumi, PhD. Candidate, University of Alberta

Wildlife Research Permit Number: WL005590

LOCATION:

Our study area lies in the northern Richardson Mountains, at the NW corner of the Gwich'in Settlement Area (GSA). Our research activities were located within the GSA, however some animals collared ventured into neighbouring jurisdictions, as revealed by satellite tracking.

RATIONALE:

This project examines the spatial relationship between Dall's sheep, grizzly bears and wolves in the Richardson Mountains. We deployed GPS collars on animals from the three populations in 2006 and 2007, and needed to retrieve collars that fell on the ground through a programmed self-release mechanism. No animal handling was involved. The recovery of the collars provided us detailed locations needed for the analysis of spatial dynamics.

OBJECTIVES:

Our objective for summer 2008 was to recover stationary collars:

To document home ranges, movements and habitat use of Dall's sheep, grizzly bears and wolves; and

To quantify the interactions between the three species.

To fulfill other objectives of the project (document traditional knowledge and complete snow monitoring) other licences were sought in 2008:

NWT Scientific Research Licence Number: WL114370 and NWT Scientific Research Licence Number: WL14300.

METHODS:

We had three days of helicopter flights over the study area to recover collars: on June 29, September 17 and September 20. Participants in the fieldwork were: Catherine Lambert Koizumi, Kristen Callaghan (GRRB Wildlife Biologist), Chris Greenland (GRRB summer student), Nicole Lights and Melody Nice-Paul (GRRB staff). Collar locations were known beforehand from a satellite system. Once on the ground, we searched for collars with the help of a VHF receiver.

RESULTS AND MAIN CONCLUSIONS:

Twelve of 13 stationary collars were retrieved in 2008. One collar could not be reached due to poor weather, and its recovery is planned for 2009.

During the recovery of a collar from the mountains in June 2008, some human remains (skull and other bones) were found in a rocky outcrop, near a collar released by a Dall's sheep the previous year. This discovery was communicated to the RCMP and relevant organizations (Gwich'in Social and Cultural Institute), and was featured in the News North local newspaper and by two local radio stations (CBC North Radio One and CKLB Aboriginal Radio).

LONG-TERM PLANS AND RECOMMENDATIONS:

Data collected from these collars will need to be completed with locations from the remaining collars, which shall fall in 2009. The main investigator will then analyze locations and spatial interactions as part of her PhD program. Published results will be distributed whenever available.

PARTNERS:

Gwich'in Renewable Resources Board

Ehdiitat Renewable Resources Council

Tetlit Renewable Resources Council

COMMUNITY INVOLVEMENT:

The crew consisted of staff of the Gwich'in Renewable Resources Board, including a summer student. Project updates were provided to the communities at the annual GRRB meeting during fall 2008 and spring 2009.

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DNA Variation in the Northern Wolf: Adaptation over Space and Time

Period: Spring 2008 to December 2008

Main Investigator: Dr. Marco Musiani, Associate Professor in Environmental Design, University of Calgary

Wildlife Research Permit Number: WL005607

LOCATION:

The study will focus on the boreal forest, central tundra and arctic regions of the Northwest Territories and Nunavut.

RATIONALE:

Recent analyses of wolves living in various habitats suggest that habitat and distribution are the primary factors explaining the genetic differences observed. As a result, six genetically distinct wolf populations have been defined in the north corresponding with specific habitats.

Tundra and taiga wolves are genetically and phenotypically different from their boreal forest counterparts. Analysis of microsatellite loci, mitochondrial DNA data and Y-chromosome microsatellite loci show that levels of differentiation between migratory and non-migratory wolves are greater than that between other North American wolf populations. Coat colour differences are dramatic between wolves in the two environments, with light and black colours predominating in taiga / tundra and boreal wolves. The presence of a unique wolf ecotype in the tundra / taiga region of North America highlights the need to preserve migratory ecosystems and understand patterns of genetic diversity in these northern species.

OBJECTIVES:

To document genome-wide patterns of genetic diversity among the six wolf ecotypes currently in the north;

To assess the influence of environmental factors on genetic variation;

To detect genomic regions under selection and identify specific associations of these genetic regions with ecologically-relevant characteristics; and

To survey historical changes in genetic diversity using ancient DNA.

METHODS:

Genome-wide survey of nucleotide and haplotype diversity – We will characterize variation in 124,000 SNPs distributed throughout the genome in about 380 wolves from a wide range of northern habitats and 100 wolves from elsewhere. Levels of nucleotide variation and linkage disequilibrium will be assessed across the genome and compared among populations and with environmental factors. The genome-wide SNP data will also be used to assess historical patterns of demography and identify genomic regions under selection and identify SNPs specific to each ecotype for analysis of past patterns of diversity.

Influence of environmental factors and demographic history on genome-wide diversity – We will associate patterns of genetic variation and differentiation with a suite of environmental variables to uncover the most significant cause of variation. Understanding the processes that influence levels of variation and differentiation is essential for maximizing the potential to respond to climate change and predicting how it will affect genetic variation.

Detecting genomic regions under selection and genome-wide association mapping of ecologically-relevant traits – Due to the availability of detailed environmental and morphological data on northern wolves, specific SNP markers can be tested for association with ecologically relevant phenotypes. This is a pioneering effort not yet attempted on this scale in a wild vertebrate species. Fine scale mapping of associated regions may reveal causative genes and mutations. Consequently, we may in some cases be able to identify the genetic basis for adaptation and thus provide important insights into the mechanisms by which populations have and may adapt to environmental change.

Observing historical changes in genetic diversity using ancient DNA – Current patterns of variability may not provide accurate inference of historical changes in genetic diversity. We propose to type a dated series of wolf remains for variation in a panel of SNPs that are diagnostic of present-day ecotypes, as well as a panel of supposedly selected or phenotype-associated SNPs, and 100 supposedly neutral SNPs. The latter will be used to infer demographic changes in past populations, as well as a background reference for inferred changes in ecotype / phenotype associated SNPs. The combined use of these markers may allow specific environmental changes in the Arctic record to be associated with ecotype turnover and changes in genetic diversity through time.

RESULTS AND MAIN CONCLUSIONS:

A set of 125 wolves from across Canada and Alaska were successfully genotyped at >48 000SNP loci that retain polymorphism. Contrary to previous studies, only five genetic populations of wolves were detected across this region, and many of the wolves were found to be highly genetically admixed between populations. This high degree of admixture can be explained by these wolves migrating between the high arctic and the boreal forest on an annual basis. This result suggests that this migratory behaviour has yielded high gene-flow between regions (boreal forest and high arctic islands).

SNP markers were found to be very powerful for detecting population structure – internal substructure was detected in a population containing only eight individuals. This result suggests that the fewer populations detected using SNP markers is not due to reduced overall sample size.

LONG-TERM PLANS AND RECOMMENDATIONS:

On-going research is still exploring selection in Canadian arctic wolves. By integrating 2 different outlier analyses with a method for looking for associations between particular SNP genotypes and environmental variables, we should be able to more robustly identify genes that are involved with differentiation between wolves in different environments. It is recommended that, to maximize power to determine causative mutations, further research should explore phenotypic variation between individual wolves, so that specific traits can be explicitly associated with genetic variation.

PARTNERS:

Environment and Natural Resources

COMMUNITY INVOLVEMENT:

Community meetings were arranged to update representatives and interested individuals of the wildlife research activities in the region. Hunters and trappers also assisted with bringing in samples of wolf hides and skulls that were hunted in the past.

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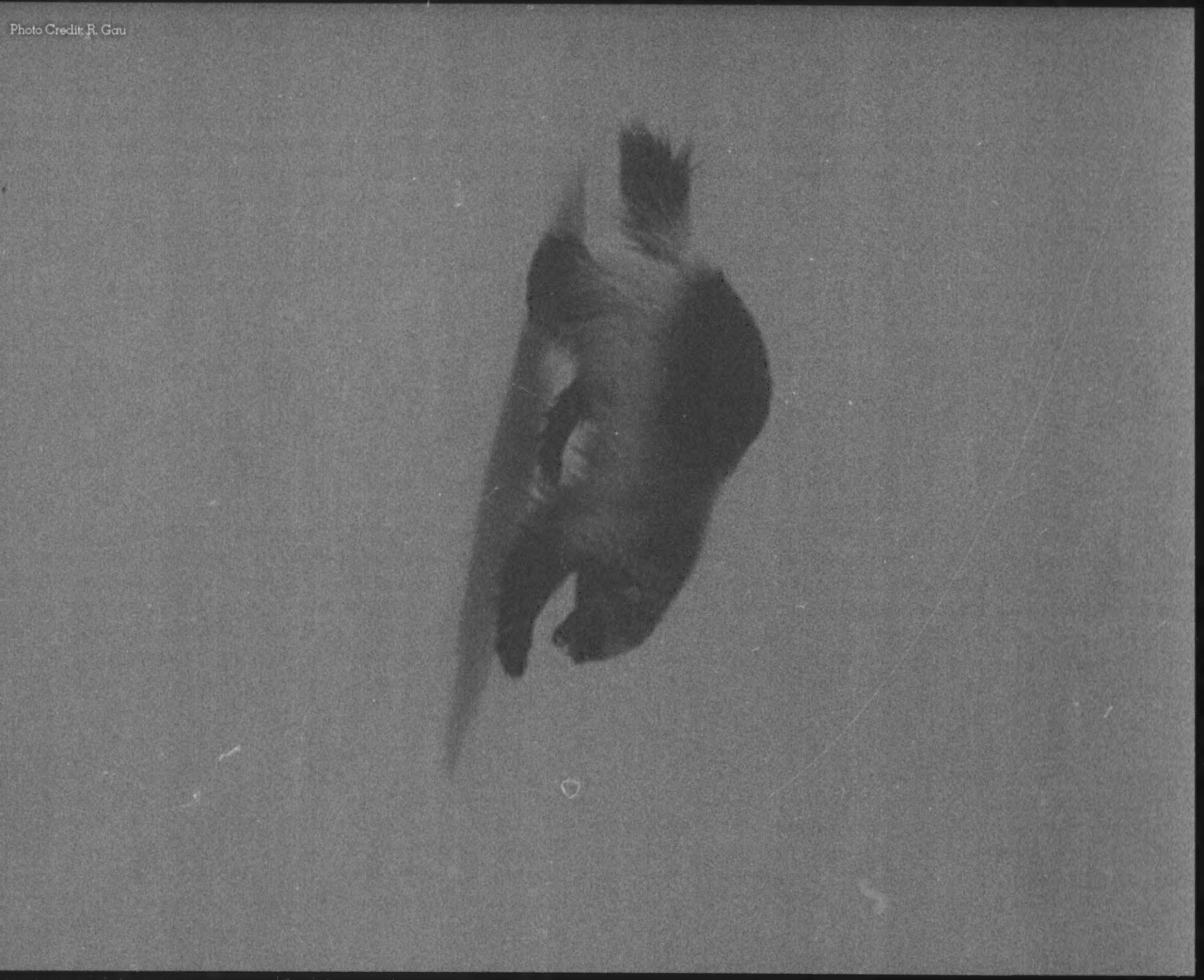

Photo Credit: R. Gau

NWT Wolverine Carcass Collection

Period: January 2008 to December 2008

Main Investigator: Robert Mulders, Carnivore / Furbearer Biologist, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL005637

LOCATION:

All NWT regions (Inuvik Region is covered under a separate WRP).

RATIONALE:

The wolverine is a scavenger and opportunistic predator that is experiencing population reduction and range retraction across North America. This species has low tolerance to negative population pressures and is vulnerable to increasing harvest pressure. In eastern Canada, wolverines have been extirpated and COSEWIC has assessed this population as Endangered. The western population is listed as Special Concern, with wolverine populations believed to be declining in British Columbia, Alberta, Saskatchewan, and Ontario. Nunavut recognized the vulnerability of this species and has assigned it a General Status Rank of Sensitive.

In the NWT, wolverines are distributed in several habitat types (mountain, boreal, and barrens) with an assigned ranking of Secure. However, with increasing resource activity in the Inuvialuit Settlement Region (ISR), Gwich'in Settlement Area (GSA), Sahtu Settlement Area (SSA), western Dehcho and on the central barrens, most regions have the potential for significant future development (oil and gas, mining, sport hunting, tourism, and hydro-electric). Environment and Natural Resources (ENR) is faced with data gaps in terms of understanding how increased harvest pressures and development activity may impact wolverines.

The GNWT encourages northern hunters and trappers to participate in the Traditional Economy. The NWT Fur Strategy aims to promote this lifestyle, enhance the marketing of furs, and ensure a sustainable harvest. Historically, ENR has used annual fur auction sale data to monitor levels of wolverine harvest. In some regions, harvest studies provide further insight into patterns of harvest. However, across much of the north an unknown number of wolverine pelts are used for parka trim and remain in the communities for domestic use. Wildlife managers require more complete harvest data.

In the Inuvik, Sahtu, and North Slave regions, there is increasing interest in providing opportunities for non-resident and non-resident alien hunters to participate in guided wolverine hunts. To determine if an increased harvest is sustainable, we require a better understanding of the current level, distribution and composition of wolverines being harvested. To do this, ENR is conducting a multi-year wolverine carcass collection. This effort will provide information on the age, sex, body condition, reproductive parameters and seasonal diet of the animals harvested. Genetic samples from harvested wolverines also complement on-going DNA mark-recapture population monitoring and research on the barrens. These datasets are used to address a range of management issues facing this species. Federal species at risk legislation requires that the NWT develop a wolverine management plan.

OBJECTIVES:

To document the level and pattern of wolverine harvest in the NWT;

To assess the age, sex ratios, condition, seasonal diet, parasite loads, and reproductive parameters of the wolverines harvested across the NWT; and

To use genetic material to compare wolverine populations across the NWT and to complement DNA hair-snagging efforts.

METHODS:

ENR is conducting an NWT-wide wolverine carcass collection. This research, together with posters and regional assistance, is being used to maintain support and participation in this project. All hunters in the NWT will be encouraged to participate and are offered financial compensation of $50 to bring in each complete skinned-out carcass and provide information on harvest date and location. This initiative will involve close collaboration with regional staff in terms of administering payment to hunters and in using a standardized necropsy protocol. The Wildlife Division is funding compensation for carcasses and is paying for subsequent tissue analysis. Sampling kits (tags and plastic bags) are made available and local Renewable Resource Officers will be asked to serve as primary contacts for local hunters and trappers. Carcass sampling primarily involves:

Whole wolverine carcasses weighed and measured;

Tooth removal for age analysis;

Skulls removed, cleaned and measured;

Stomach contents collected for diet analysis;

Intestines may be examined for parasites;

Body condition assessed;

Female reproductive tracts examined; and

Tissue collected for genetic analysis.

RESULTS AND MAIN CONCLUSIONS:

The main investigation is currently analyzing the data collected in this project. Results will be distributed as soon as available.

LONG-TERM PLANS AND RECOMMENDATIONS:

No long-term plans or recommendations were submitted.

COMMUNITY INVOLVEMENT:

Local hunters and trappers bring in wolverine carcasses to local ENR offices.

CONTACTS:

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Nahanni Wood Bison Population Monitoring Project

Period: March 2008 – 2009

Main Investigator: Paul Kraft, Superintendent, Environment and Natural Resources, GNWT, Dehcho Region

Wildlife Research Permit Number: WL005636

LOCATION:

Fort Liard area.

RATIONALE:

The Nahanni bison population is currently considered free of two important diseases to bison, brucellosis (caused by the bacteria *Brucella abortus*) and tuberculosis (caused by *Mycobacterium bovis*), that are found in bison populations in and around Wood Buffalo National Park. The Nahanni herd is protected in part by maintaining a large bison-free zone in the southern NWT to prevent contact with infected bison from Wood Buffalo National Park. Monitoring the Nahanni bison population for these two diseases provides a measure of the effectiveness of the bison control program, and confirms the disease-free status of the herd.

To date, sampling and testing of the herd has been done in conjunction with ongoing bison research efforts and opportunistic testing of bison mortalities. This information is important to help confirm the brucellosis and tuberculosis-free status of this herd and determine the effectiveness of the bison control program. With this new initiative we want to increase our sample size & provide some very good quality samples and data for a group of animals. By doing intensive testing on up to 10 bison around the community of Fort Liard, we will increase the confidence in the health status of the Nahanni bison herd.

OBJECTIVES:

To monitor the Nahanni bison herd for the presence of brucellosis and tuberculosis in addition to other diseases and parasites common to bison.

METHODS:

Conduct testing on any hunter-killed bison or bison highway mortalities to analyze for the presence of two important diseases, tuberculosis (*Mycobacterium bovis*) and brucellosis (*Brucella abortus*), as well as other common diseases of bison. Hunters will be requested to collect blood, lymph nodes, and fecals in addition to inspecting carcasses for tuberculosis lesions or signs of brucellosis.

The culling of up to an additional 10 bison within or around the community of Fort Liard from March 2008 through March 2009 for the purpose of disease testing. GNWT employees, with the assistance of local hunters will collect blood, a range of body tissues, and fecal samples. In addition, carcasses will be inspected for tuberculosis lesions or signs of brucellosis.

RESULTS AND MAIN CONCLUSIONS:

There were no hunter-killed bison or bison highway mortalities associated with this permit.

Five adult males were culled within or around the community of Fort Liard; 3 males were aged 11 or older.

ENR staff and local hunters collected a range of biological samples and inspected each carcass.

No tuberculosis lesions or evidence of brucellosis were found in any carcass.

There was evidence of previous wounding as a result of gunshot in 2 of the 5 carcasses.

Samples were submitted for disease testing.

LONG-TERM PLANS AND RECOMMENDATIONS:

There is a need for an appropriate long-term disease monitoring program designed specifically for the Nahanni wood bison population.

COMMUNITY INVOLVEMENT:

Local hunters were hired from Fort Liard.

CONTACTS:

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Monitoring of the Liard Wood Bison Population

Period: July 2008 to December 2008

Main Investigator: Nic Larter, Regional Biologist,
Environment and Natural Resources, GNWT, Dehcho Region

Wildlife Research Permit Number: WL004970

LOCATION:

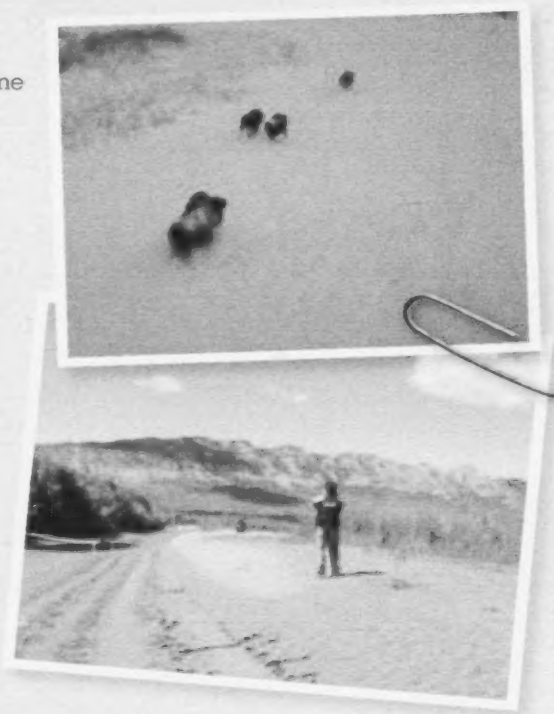
The Liard bison classification survey was conducted from the BC-NT border up to Blackstone River on the Liard River; all tributaries and islands were checked for bison.

The survey was conducted July 20-23, 2008.

RATIONALE:

First Nations wanted to know the status of the bison herd; they mentioned that there has been little to no research done (prior to 2002) on the herd since they were reintroduced.

Environment and Natural Resources has conducted this annual survey since 2002, to document cow:calf ratios.



OBJECTIVES:

To measure calf, yearling, and bull:cow ratios during the post-calving period;

To monitor annual calf production and estimate overwinter survival of calf bison;

To collect biological samples as and when available from harvested animals or those involved in motor vehicle collisions;

To document seasonal movement patterns and range use of male and female bison throughout the range;

To document the frequency of river crossings by collared animals;

To identify and monitor the presence and movements of "town" male bison;

To monitor the presence and behaviour of bison in communities;

To document the year round diet of Nahanni wood bison; and

To monitor the Nahanni wood bison population for the presence of brucellosis, tuberculosis and Johne's disease.

METHODS:

A boat will be used to gain access to areas where bison are located along the river valley; observers will use binoculars and recording devices to classify bison by the size and shape of their horns.

Female and male bison will be chemically immobilized. GPS and satellite collars will be deployed on female bison, satellite and reflective VHF collars will be deployed on male bison.

Blood samples will be collected and analyzed for diseases from immobilized, hunter killed, and vehicle collision involved bison.

RESULTS AND MAIN CONCLUSIONS:

We classified 161 bison during the survey.

Maps of the survey results were circulated to local First Nations.

Additional collars were deployed during winter.

Satellite collars were deployed on 2 adult males.

Collars were deployed on 5 females (2 satellite and 3 GPS).

No bison were harvested under quota, but seven bison were removed under separate permits due to human safety issues, and four other bison were put down; biological samples and at least partial necropsies were performed.

Lab analyses of fecal samples were completed and the bison diet database was updated accordingly.

The main network of bison trials in Fort Liard was mapped with GPS.

LONG-TERM PLANS AND RECOMMENDATIONS:

Continued monitoring of population demography with another aerial survey to estimate the populations is scheduled within the next 1-2 years, pending information from collared animals.

Continued collaboration with the Government of the Yukon on population monitoring.

Monitoring of collared wood bison and analysis of movement and range use.

Continued annual sex/age classification survey.

Monitoring of bison frequenting communities.

Working with communities to develop the Wood Bison Management Strategy for the Northwest Territories.

Continued monitoring for disease and the collection of biological samples from hunter-killed, darted or deceased bison as the opportunities arise.

Also see File Report No. 136, *History on Current Status of the Nahanni Wood Bison Population*, Larter N.C. and D.G. Allaire, 2007, Environment and Natural Resources website.

Website: www.enr.gov.nt.ca

PARTNERS:

Environment and Natural Resources

Yukon Territorial Government

COMMUNITY INVOLVEMENT:

Local residents have participated as river guides for surveys. During annual community meetings and biannual regional wildlife workshops, the program is evaluated and critiqued by local First Nations and program comments are discussed and addressed.

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Mackenzie Wood Bison Monitoring Project

Period: February 25, 2008 to December 31, 2008

Main Investigator: Terry Armstrong, Bison Ecologist, South Slave Region, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL005635

LOCATION:

Mackenzie wood bison population range.

RATIONALE:

The Mackenzie wood bison population was re-established in 1963 when 18 animals were released north of Fort Providence. The release was a success as numbers observed on aerial surveys of the Mackenzie Bison Sanctuary increased consistently until 1989, and bison expanded their range from the initial core area. The population was estimated at approximately 2000 animals in the year 2000, and by 2006, bison occupied range from the Mackenzie River to Frank Channel and east along Highway 3 towards Yellowknife, NT.

Photo Credit: T. Armstrong

Annual composition surveys provide data that help us detect changes in herd productivity and determine the ratio of breeding-age males to females. These data are useful for evaluating the impact of selective hunting, differential mortality due to anthrax and other causes of death. Surveillance for bison dead due to anthrax enables Environment and Natural Resources to respond in the event of an outbreak.

OBJECTIVES:

To complete a census of the Mackenzie bison population;

To measure calf, yearling and bull to cow ratios during the post-calving period; and

To monitor the Mackenzie herd for the occurrence of anthrax related mortalities in summer.

METHODS:

An aerial census was carried out February 26 - March 8, 2008. Personnel included a navigator, two observers and a pilot. The census zone included the entire known distribution of bison in the region between the Mackenzie River and Frank Channel (Fort Providence to Behchokǫ̀) and east of Behchokǫ̀ 45 km towards Yellowknife. The area was flown at 150 m above ground level following linear transects spaced at 2.5 km intervals. Bison were counted along 0.5 km strips on either side of the aircraft, under the aircraft and off transect. A total count of bison observed was recorded and population size was estimated from bison seen on transect.

RESULTS AND MAIN CONCLUSIONS:

Weather conditions varied during the population census and some time was lost due to poor visibility, but the survey was completed in 12 days of flying. We counted over 1250 bison in total and estimated the population at 1579 with a standard error of 121.

Herd composition was sampled on July 12 and 13, 2008, when 602 animals, approximately 38% of the total population, were observed. Calf ratio was 32.2 calves per 100 cows, very similar to the recent nine year average of 35.9. There were 24.4 yearlings per 100 cows compared to the average 18.7 for the previous nine surveys, and bulls numbered 105 per 100 cows in 2008 compared to the nine year average of 85.2.

LONG-TERM PLANS AND RECOMMENDATIONS:

Recommend estimating population size every four years to detect potential problems in time to act on them and to reveal trends in population size, also to continue monitoring herd composition annually if possible, especially calf to cow ratios.

COMMUNITY INVOLVEMENT:

Community representatives from the Fort Providence Resource Management Committee and from Behchokǫ̀ to assist with the census.

CONTACTS:

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Wildlife Health & Genetic Monitoring

Period: January 1, 2008 to December 31, 2008

Main Investigator: Brett Elkin, Disease and Contaminants Specialist, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL005634

LOCATION:

NWT-wide.

RATIONALE:

Although most wild animals are healthy, diseases and parasites do occur in any wildlife population. Some diseases and parasites are naturally occurring and appear to cause little problem in their host, while others have the potential to impact wildlife at both the individual animal and population level. Some of these diseases and parasites can also affect people and domestic animals.

Samples from animals harvested by hunters and trappers, found dead, or handled during wildlife research or management activities by Environment and Natural Resources staff, other wildlife agencies or university researchers can provide valuable health & genetic information on wildlife populations. These samples provide an opportunity to monitor diseases of particular importance to wildlife and human health, and to identify new and emerging diseases. Taking advantage of samples from these existing activities provides additional valuable information for making wildlife management decisions and providing public information.

OBJECTIVES:

To determine the cause of sick or dead wildlife found, harvested or handled by hunters, trappers, biologists, wildlife researchers, Renewable Resource Officers, or the general public;

To assist hunters and trappers by testing samples from harvested wildlife to determine what diseases or parasites are present, and the implications for consumption of the carcass;

To work co-operatively with hunters, trappers, biologists and Renewable Resource Officers to monitor the occurrence of diseases and parasites in wildlife on an ongoing basis;

To identify the types, relative levels and geographical distribution of diseases, parasites and abnormalities found in wildlife across the Northwest Territories;

To increase community awareness of diseases and parasites; and

To collect genetic information that will contribute to the understanding and management of wildlife populations.

METHODS:

Samples are collected in several different ways:

Local hunters, trappers and Renewable Resource Officers frequently submit samples from harvested wildlife. They generally provide detailed information on the animal and the particular case, and often provide additional information on the occurrence and patterns of similar cases within their harvest areas;

Members of the general public, wildlife biologists or Renewable Resource Officers may also submit samples from wildlife that are sick or found dead;

Samples from animals handled during wildlife research or management activities may be submitted by biologists, technicians, other wildlife researchers or Renewable Resource Officers and are also submitted for disease testing;

Samples of the affected tissues or body parts are collected, as well as other samples necessary to determine health status, body condition and age; and

Samples are analysed for diseases, parasites and/or genetics. In some cases, this requires the shipment of samples to specialised laboratories to determine the cause of any abnormality. Results of the testing are provided to the individual(s) who submitted the sample, and are recorded in an NWT disease database to monitor disease trends across the NWT and over time.

RESULTS AND MAIN CONCLUSIONS:

Hunter submitted samples in 2008 (lab tested): ~200 samples submitted for disease surveillance.
National avian influenza surveillance - Birds (not detected)
National West Nile Virus - Birds & Mosquitoes (not detected)
Baseline health survey of Boreal Caribou (29 tested)
Disease surveillance of Bathurst Caribou (69 tested)
Disease surveillance of Bluenose West Caribou (17 tested)
Disease surveillance in Banks Island Muskox (376 tested)
Brucellosis & TB surveillance in wood bison (30 tested)
Trichinella surveillance – multiple species (282 tested)
Rabies surveillance (17 submissions, 4 positive)
Anthrax surveillance in MBS & SRL (not detected)
Contaminant testing in caribou (108 samples tested)
Sahtu community wildlife health monitors (88 samples)

Products Produced:
Reports to individual hunters and trappers
NWT wildlife disease surveillance & database
NWT rabies surveillance & database
Wildlife Anthrax Database developed with Canadian Cooperative Wildlife Health Centre
Participation in national Avian Influenza & West Nile Virus surveillance programs

LONG-TERM PLANS AND RECOMMENDATIONS:

Wildlife disease surveillance is ongoing every year.

Long term testing will continue on any hunter submitted samples, animals found dead, and the investigation of disease cases or outbreaks. Results of this testing will be used to provide information and recommendations to individual harvesters, the public, and wildlife management agencies and wildlife co-management boards.

PARTNERS:

Local hunters and trappers

Members of the general public

Environment and Natural Resources biologists and Renewable Resource Officers

Canadian Cooperative Wildlife Health Centre

Canadian Food Inspection Agency

COMMUNITY INVOLVEMENT:

Hunters and trappers frequently bring in samples or provide reports of diseases, parasites or abnormalities in harvested wildlife. Identification of the diseases or parasites involved in these cases can be important to make decisions on consumption of meat from the affected animal. Sick or dead animals are also found periodically in the wild, and testing is required to determine the cause of death and potential significance for other wildlife and people. Information provided by hunters and trappers on the occurrence of diseases and parasites can also be used to identify areas requiring further monitoring or testing. Local hunters, trappers and members of the general public are encouraged to submit samples of any abnormalities they find in the wildlife they harvest. Results of testing are provided back to the individuals submitting the samples following diagnostic testing.

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Photo Credit: John Nagy

Bathurst Caribou Health, Condition and Contaminant Monitoring

Period: January 1, 2008 to December 31, 2008

Main Investigator: Bruno Croft, Manager, Research and Monitoring, North Slave Region, Environment and Natural Resources, GNWT, North Slave Region

Wildlife Research Permit Number: WL005658

LOCATION:

The spring joint scientific and community collection took place near Beaver Lodge Lake, north of Gameti, NT, between March 10 - 15, 2008.

The fall collection took place just south of Lac De Gras winter road camp between September 8 – 12, 2008.

RATIONALE:

Health, body condition, disease and parasite status of barren-ground caribou provide important information on the status of the herds and on the potential for population growth. Samples taken from animals harvested for health assessment permit current levels of environmental contaminants to be determined and trends over time to be assessed.

OBJECTIVES:

To collect information on the health, diseases and parasites of Bathurst caribou to assess current status and monitor trends over time;

To collect information on body condition of caribou on the Bathurst range during the fall, which can be used to assess nutritional status and predict pregnancy rates;

To collect information on the presence of environmental contaminants in caribou, to assess current exposure and trends over time; and

To compare this information to previous information from the Bathurst caribou herd and other caribou herds across the north using a standardized protocol developed by the CircumArctic Rangifer Monitoring & Assessment Network (CARMA) and previous collections by Environment and Natural Resources (ENR).

METHODS:

Health, condition and contaminant sampling was conducted on caribou harvested by community hunters on the Bathurst caribou range in late winter and fall of 2008. A field camp was established based on the location and distribution of caribou, determined by location of collars and advice from the communities. Local hunters harvested and butchered the caribou, and detailed measurements and sampling were conducted on each animal to examine health, disease and parasites, condition and contaminants. Meat will be returned by plane for distribution within local communities. Field sampling and laboratory testing are done using a standardized protocol developed by CARMA and previous collections by ENR. Samples were collected in the field and stored in a manner consistent with future testing needs. Samples included a wide range of tissues: blood (whole blood & filter paper), metatarsus bone with skin on, kidney (left) with fat, liver (caudate lobe), 4th stomach (abomasums), intestinal samples (small intestine, caecum & colon sample), urine, feces, and hair. Some measurements were done in the field (e.g. body weight), and for others samples were processed in Yellowknife (e.g. kidney fat index) and outside laboratories (e.g. contaminants, tooth aging). As part of this protocol, the following measurements and samples were taken:

Diseases & Parasites:

Exposure to disease such as brucellosis, besnoitia, toxoplasma & Johne's disease (blood serology, tissue culture, fecal culture)

Presence of parasites of importance to caribou health (Wisconsin fecal flotation, Baerman's technique, DNA analysis of recovered larvae, muscle examination, examination of hide / throat)

Body Condition:

Age (tooth eruption & wear pattern, tooth cementum analysis)

Body measurements (carcass weight, body measurements, gastrocnemius muscle weight, leg measurements, jaw measurements)

Body fat indicies: back fat, kidney fat (total & Riney fat index), bone marrow fat (%)

Genetics (hair sample for DNA)

Environmental Contaminants:

Kidney & liver levels of heavy metals

RESULTS AND MAIN CONCLUSIONS:

29 cows and 9 calves were collected during the spring collection and all females were pregnant. All caribou were in decent shape.

13 bulls, 12 cows and 6 calves were collected during the fall collection and most animals were not in as good a condition as observed the previous fall.

Final results of the analyses are not completed yet, but preliminary results suggest absence of abnormal level of parasites, diseases or below average condition.

LONG-TERM PLANS AND RECOMMENDATIONS:

These initiatives are part of the monitoring actions identified in the *Bathurst Caribou Management Plan* (2004) and the long term objective is to continue to assess health and condition of caribou using a less detailed sampling protocol that can be carried out at the community level.

PARTNERS:

Tłı̨chǫ Government and the community of Gameti (spring hunt) and the North Slave Métis Alliance (fall hunt).

COMMUNITY INVOLVEMENT:

Information from the communities was used to help select a site where caribou will be collected, and we worked with hunters in the field to discuss the health and condition of caribou that were collected and tested.

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The Presence and Distribution of Fungal Endophytes in Fescue Grasses in Four Communities Along the Proposed Mackenzie Valley Pipeline Route, Northwest Territories.

Period: June 2008 to August 2008 (field work); July 2010 and ongoing (laboratory analysis, write up)

Main Investigator: Paul Marmer, B.E.S. (Master's Candidate) and Professor Dawn Bazely, B.Sc., M.Sc., D. Phil. Institute for Research and Innovation in Sustainability

Wildlife Research Permit Number: WL005609

LOCATION:

The study took place in four communities along the Mackenzie River Valley, where there are both existing transportation and proposed corridors, such as the Mackenzie Valley pipeline. Grasses were sampled from along roadsides, and where possible, open areas in communities and along existing tracks.

RATIONALE:

Nearly all of the main agricultural forage grass species that are widely planted in Europe and North America have, living inside them, a systemic (inhabiting the whole plant) fungus. Not all grass plants contain the fungus – some individuals are uninfected. This group of fungi are related to disease-causing fungi. However, unlike their pathogenic (disease-causing) relatives, the endophytic fungi living inside the agricultural grasses are invisible to the naked eye. This means that their existence is never revealed externally by signs of fungal infection such as spore-producing patches. The endophytic fungi of agricultural grasses are symbiotic with their host grass plant. They produce compounds that are toxic to animals and insects that feed on the host grass. The levels at which fungi are present in naturalized and native populations of these grasses and their relatives is much less well understood outside of agricultural areas.

From earlier research in Sweden, Norway and other parts of northern Canada, members of Dawn Bazely's laboratory found that the proportions or total numbers of grasses having the fungus in them are much lower in more northerly regions and at higher altitudes compared with areas of grassland further south, in southern Europe and the USA. But, grasses with the fungus are definitely present.

As more routes into northern regions of Canada are created, and as travel along these and existing corridors increase, we may expect to see increased movement of species such as these endophytic fungi and their host grasses northward. The role that these endophytic fungi of grasses play in influencing how ecosystems and the species in them function is largely unknown. This research was developed, in part, due to the high number of herbivores that are known to be affected by the toxins that the fungi produce in northern regions: small mammals and large grazing herbivores. This was primarily envisioned as a baseline study to scope out the presence of endophyte infected grasses.

OBJECTIVES:

To determine endophyte infection status among selected fescue grass species along the Mackenzie Valley in the NWT;

To investigate large-scale patterns of abundance and distribution of endophyte infection among selected fescue grass species;

To investigate possible relationships between endophyte infection and altitude, latitude, grazing intensity and distance to disturbance; and

To assess the potential for northward movement of fungal endophyte-infected grasses in the NWT.

METHODS:

Sampling was conducted in and around four settled communities – Fort Simpson, Norman Wells, Fort Good Hope and Inuvik – in the Mackenzie River Valley, Northwest Territories. The study areas were selected for their locations along the approximately 1000 km Fort Simpson-to-Inuvik portion of the proposed Mackenzie Valley gas pipeline, providing a broad latitudinal sampling gradient. The study area also included a portion of the Norman Wells pipeline, in operation since 1985 and extending 869 km from Norman Wells, NT, to Zama, northwestern Alberta. The latter pipeline originates in Norman Wells and passes through Fort Simpson, providing an opportunity to sample grasses in two areas in which a pipeline corridor had long been present. The Mackenzie Valley consists of boreal forest and discontinuous permafrost. The region contains important rare plant species, including Raup's Willow and the endemic Nahanni Aster (NWT 2006).

RESULTS AND MAIN CONCLUSIONS:

During his field work in 2008, Paul Marmer found both indigenous (native) populations of fescue species in the communities, and also non-indigenous patches of these grasses. These non-native plants are being introduced through roadside vegetation efforts. Many members of local communities expressed the view that in cases where revegetation is taking place, local sources of plant seeds should be available. Difficulty finding local indigenous seed sources is a problem for habitat restoration efforts across Canada.

Paul screened the several hundred grass shoots that he collected from along roadsides to find out whether or not they had the fungal endophyte of interest (called an Epichloae fungus). Results showed endophyte-infected fescue grasses along roadsides in the four communities. In the graph below, we see that in any one area that was sampled (indicated by one point on the graph), from 0 to 60% of the grass shoots were found to contain the fungus. At the moment, these results are being checked by visually inspecting a small sample of the screened grasses to detect the fungus under the microscope. The two patterns found so far are that the presence of endophytic fungi was higher in more northern populations of Festuca ovina, but that the presence of endophytic fungi declined the further north we travelled and sampled in Festuca rubra. Interestingly, Paul found that there was more reseeding of areas in communities further south.

LONG-TERM PLANS AND RECOMMENDATIONS:

These results will be included in a larger study of the endophyte infected grasses in northern regions. For example, Ms. Nora Saona is completing her Ph.D. looking at the various local conditions across northern regions that affect how likely infected grasses are to thrive and outcompete uninfected, non-toxic grasses.

One of the main, immediate recommendations is that when it comes to revegetating roadsides, cutlines and other routes, there should be policies in place to support use of local native grass seeds, and there needs to be support for businesses that can provide these seed sources so that seed is not being imported from further south. More southern seed sources of these grasses are much more likely to contain these toxic endophytic fungi.

PARTNERS:

No specific partners for this particular IPY sub-project.

COMMUNITY INVOLVEMENT:

While doing field work, we spoke with many local band offices and community members about roadside grading and maintenance, and discovered that there is concern about the difficulty of obtaining local seeds for revegetation purposes. Also, we were privileged to work with local high school students in the field, sampling grasses.

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Photo Credit: Anne Gumm

Small Mammal and Hare Transect Surveys

Period: June 2008 to September 2008

Main Investigator: Suzanne Carrière, Wildlife Biologist Biodiversity, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL005639

LOCATION:

Sahtu

Norman Wells:	65° 18' N; 127° 20' W
Tulita:	64° 54' N; 125° 34' W *

North Slave

Yellowknife:	62° 24' N; 114° 26' W
Bliss Lake:	62° 34' N; 113° 20' W *
Gordon Lake:	63° 00' N; 113° 10' W
Daring Lake:	65° 00' N; 111° 30' W

Dehcho

Fort Liard:	60° 39' N; 117° 29' W *
Fort Simpson:	62° 00' N; 122° 00' W

South Slave

Fort Smith:	60° 01' N; 111° 54' W
Fort Resolution:	61° 10' N; 113° 40' W

Inuvialuit-Gwich'in

Inuvik:	68° 18' N; 133° 29' W

* Survey not performed in 2008 due to unavailable personnel.

All surveys were done between June 1st to September 15th 2008.

OBJECTIVES:

The NWT Small Mammal Survey monitors changes in density of voles, mice, lemmings, and shrews across five ecozones in the territory. The Hare Transect Survey monitors snowshoe hare density across all forested ecozones.

METHODS:

Small mammal data is collected using snap-traps or live traps and reported as the number of trapped specimens per 100 trap-nights (capture index). Monitoring is done on standardized permanent trap lines. Usually, 100 traps are out for five nights. Trap lines are checked at least each morning before 10:00 a.m. The trapping is planned for August each year, but at some sites the survey is performed in June, July or September if other activities require a change in timing.

Hare data is collected on four transects at each site. Each transect consists of 20 permanent quadrats measuring 5.1 cm x 305.0 cm oriented along the transect and evenly spaced 15 to 30 m apart. Hare fecal pellets deposited within each quadrat are counted and cleared from the quadrat. The number of pellets per quadrat is then correlated to an estimate of hare density (number of hare per hectares) at each site.

RESULTS AND MAIN CONCLUSIONS:

In summer 2008, small mammal numbers were low in all sites in the NWT except Inuvik where a high in numbers occurred.

Peaks in hare numbers occurred in the NWT every 10 years or so, in 1962, 1971, 1980, 1990, and 1999-2000. Hare populations across the NWT remained low between 2002-2006, but are increasing rapidly in 2008 and are expected to reach a peak in numbers in 2009-2010.

LONG TERM-PLANS AND RECOMMENDATIONS:

The survey should be expanded to the tundra (Banks Island and Victoria Island and the mainland) to track small mammal numbers in these areas. Environment and Natural Resources (ENR) is looking for people interested in conducting the survey near Ulukhaktok, Sachs Harbour or Paulatuk.

This survey is part of long-term efforts to monitor the natural fluctuations in both forested and tundra ecosystems in the NWT. Plans are to continue the survey and expand the number of sites with community advice.

The information from both hare and small mammal surveys is used in many other projects, for example to predict furbearer abundance in the NWT. Other agencies or organizations also rely on results from the small mammal survey and hare surveys to complement their studies. Survey data are used to study the relationship between small mammal fluctuations and weather (C. Krebs, University of British Columbia; Krebs et al. 2002). Hare data was used to study the relationships between chemical defences of paper birch against herbivory, hare browsing, and forest fire frequency at a continental scale. This study was accepted for publication in the journal *American Naturalist* (J. Bryant and J. Cook, Univ. of New Mexico).

Small mammal data is also used to assess natural changes in annual predation rates on eggs and young of alternate prey species, such as whooping crane (Brian Johns, CWS, Wood Buffalo National Park) and other waterfowl species.

Website: www.enr.gov.nt.ca

COMMUNITY INVOLVEMENT:

Over the years, biologists from government, co-management boards and non-profit organizations, renewable resources officers, academic researchers, and environmental consultants have all participated in data collection for both projects. At some sites, students assisted in data collection during research camps or school field courses. The success of the NWT Small Mammal Survey and Hare Transect Survey is possible because of the combined efforts of all project participants.

PARTNERS:

Participating agencies and organizations in 2008 included:

Environment and Natural Resources

Deninu K'ue First Nation, Sahtu Renewable Resources Board

Gwich'in Renewable Resource Board

Ducks Unlimited Canada.

CONTACTS:

Norman Wells: Richard Popko (Wildlife Technician, Environment and Natural Resources, GNWT, Sahtu Region)

Yellowknife: Suzanne Carrière (Biologist, Environment and Natural Resources, GNWT, Wildlife Division), Gila Somers (INAC), Michele Stacey, Kristen Snyder (summer students)

Bliss Lake: Environment and Natural Resources, GNWT, North Slave Office

Gordon Lake: Suzanne Carrière (Biologist, Environment and Natural Resources, GNWT, Wildlife Division) and Michele Stacey (summer student)

Daring Lake: Steve Matthews (Biologist, Environment and Natural Resources, GNWT, Wildlife Division) and students at Daring Lake Tundra Science Camp

Fort Simpson: Danny Allaire (Wildlife Technician, Environment and Natural Resources, GNWT, Dehcho Region) and Steve Gooderham

Fort Smith: Allicia Kelly (Biologist, Environment and Natural Resources, GNWT, South Slave Region), Rick Mandeville, Karl Cox, Terri Armstrong, Heather Sayine-Crawford (Environment and Natural Resources, GNWT, South Slave Region)

Fort Resolution: Allicia Kelly (Biologist, Environment and Natural Resources, GNWT, South Slave Region), Rick Mandeville and Karl Cox (Environment and Natural Resources, South Slave Region) with help from Deninu K'ue First Nation

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Photo Credit: Tracz Boyan

Summer Field Assessment and Advance Barging and Staging Project: 2008-2011

Period: 2008 – 2011

Main Investigator: Susan Sevcenko, MGM Energy

Wildlife Research Permit Number: WL005588

LOCATION:

The study conducted in July 2008 examined several potential well sites, barge landings and access routes on the outer western Mackenzie Delta, Ellice Island and the unnamed island between Ellice and Langley Islands.

RATIONALE:

The purpose of the study was to examine locations in the Mackenzie Delta identified for potential well sites and barge landing sites as part of a proposed 2008-2009 winter drilling program. The sites were examined to determine if sensitive biophysical resources may potentially be affected by winter drilling and seismic activities.

OBJECTIVES:

The investigation component of the study focused on identifying and documenting wildlife habitat potential in the vicinity of proposed winter activities (i.e. proposed roads, seismic program areas, well sites, multi-season ice pad and barge landing and staging sites). Information collected during the study was used in planning and determining appropriate locations for 2008/2009 drilling and seismic activity components. Recommended set-back distances were applied where areas of sensitive wildlife habitat was identified at selected sites.

METHODS:

Prior to field investigations, the potential locations were subject to desktop review, to identify any known areas of concern.

Each location was surveyed to characterize the wildlife habitat potential at proposed project locations. Potential locations were further refined during the field work by consultation with representatives of the drilling and construction operators. Field investigations focused on the presence of signs of wildlife use.

Results of the biophysical survey were provided to a KAVIK-AXYS Inc. wildlife biologist for a qualitative habitat characterization based on vegetation composition, cover and structure, site photographs and incidental observations. The wildlife habitat ratings focused primarily on key habitat and observations of wildlife species. Polar bears typically den in snow drifts, and as such denning habitat suitability was not assessed due to the late summer (late July) timing of the survey.

RESULTS AND MAIN CONCLUSIONS:

The well sites and barge landings support important migratory bird breeding, foraging, and staging habitat, however, these activities should not be impacted by the winter drilling and seismic program, and mitigation to reduce impacts on migratory bird habitat should be applied. Some well sites and the barge landing alternate provide more suitable terrestrial mammal habitat; however, none of the sites provide suitable grizzly bear denning habitat. Fox dens were found at the barge landing alternate and one well site; these den locations should not be disturbed, as they are generally occupied year-round, and for many generations. Evidence of grizzly bears was found at two well sites during the fall surveys. However, because none of the sites provide grizzly bear denning habitat, impacts of winter drilling and seismic activities should be minimal. A wolverine was observed near the preferred barge landing.

LONG-TERM PLANS AND RECOMMENDATIONS:

Some mitigation determined from this study is:

Disruption to migratory birds will be kept to a minimum by removing barges in the shortest possible timeframe; barge travel routes will avoid passage near coastlines; Inuvialuit Game Council and Canadian Wildlife Service (CWS) guidelines will be followed where practical; MGM Energy Corp. will liaise with Environment and Natural Resources and CWS and incorporate the results of the den location information; avoidance will be the primary mitigation and wildlife monitors will be present and consulted during activities.

PARTNERS:

KAVIK-AXYS Inc. – Calgary and Inuvik offices

COMMUNITY INVOLVEMENT:

MGM Energy Corp. informed the local Hunters and Trappers Committees of the planned activity on the land and a local wildlife monitor was a member of the field team.

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MGM Energy

Selwyn Project Wildlife and Wildlife Habitat Baseline Studies

Period: May 14, 2008 to October 31, 2008

Main Investigator: Selwyn Resources Ltd.

Wildlife Research Permit Number: WL005180

LOCATION:

The Selwyn Project is a zinc-lead mining exploration and development project located in the southeast Yukon (YT), straddling the YT and Northwest Territories (NT) border. The closest community to the project site in the Sahtu Settlement Area is Tulita, NT.

RATIONALE:

The baseline studies are an important component for understanding wildlife and wildlife habitat resources in a remote part of the NT, and will form a component of a permit application to regulators. Limited studies have been conducted previously in this area. Data collected under this program will provide a broader understanding of the biophysical environmental conditions of the region prior to project development.

OBJECTIVES:

To determine seasonal distribution and abundance of selected wildlife species within the Selwyn Project area;

To identify key, critical and sensitive habitats for selected wildlife species;

To fill gaps in vegetation sample collection for metal analysis. The 2008 program is a continuation of studies started in 2007; and

To determine baseline metal levels in selected wildlife forage plant species.

METHODS:

Studies that were carried out and the methods used include:

Woodland Caribou – aerial helicopter surveys, contouring high elevation mountain blocks, were undertaken during the calving, post-calving and fall rut seasonal periods. Surveys were led by R. Farnell, Yukon Biologist, Whitehorse, YT.

Gyrfalcon and Golden Eagle Nest Surveys – aerial helicopter surveys were conducted by contouring suitable nesting cliffs in the study area. Coverage involved slow multiple passes of larger cliffs from valley bottom to about 1800 m (or 6000 ft). Survey was led by D. Mossop, Ornithologist, Northern Research Institute, Whitehorse, YT.

Metal Levels in Vegetation – nine lichen *(Clarina stellaris)*, five horsetail *(Equisetum arvense)*, and six willow *(Salix planifolia)* were selected for sample collection. Samples were frozen and sent to Maxxam Analytics Inc in Burnaby, BC, for analysis. A duplicate sample of each life form was also assayed.

RESULTS AND MAIN CONCLUSIONS

Woodland caribou survey for the calving period was completed on May 29, 2008. Ten caribou were encountered during the survey in six groups. The post-calving survey was conducted July 13-14, 2008. A total of 665 caribou were observed in 89 groups. The fall rut survey was undertaken on October 2-3, 2008. 151 caribou were encountered in 14 groups. All caribou encountered were found in high elevation alpine habitats. Ambient temperatures during the fall survey were similar to those during the July post-calving survey.

A survey of cliff nesting birds of prey was completed on June 20-21, 2008. Ten raptor nest sites were identified. Nine were golden eagle nest sites, and one was a gyrfalcon aerie. Golden eagle were the dominant nesting raptor in the area; however, none of the sites identified were raising young during the 2008 breeding season.

All vegetation samples collected were analyzed for heavy metals. The metal levels reported from vegetation samples represent the inherent variability that is present from natural sources (e.g. geologic environment) prior to mine development.

Selwyn has developed a summary report, including figures, of the results of the 2008 field program. This report has been provided to Environment and Natural Resources, and community groups.

LONG-TERM PLANS AND RECOMMENDATIONS:

It is expected that baseline studies for the Selwyn Project will continue in subsequent years to support environmental permitting for the project.

Website: www.selwynresources.com

PARTNERS:

Yukon Department of Environment, Whitehorse and Watson Lake, YT

Ross River Dena Council, Ross River, YT

Northern Research Institute, Whitehorse, YT

CONTACTS:

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Izok Project, Wildlife and Wildlife Habitat Baseline Studies, Zinifex Canada Inc.

Period: January 2008 to December 2008

Main Investigator: Jesse Dunford

Wildlife Research Permit Number: WL005664

LOCATION:

The study area is located in the Izok Lake area of the Kitikmeot region of Nunavut, and is generally limited to a 30 km buffer surrounding all potential developments associated with the project, including the preliminary road alignment from Izok to Lupin. The closest communities are Kingaok (Bathurst Inlet) and Wekweètì.

RATIONALE:

The objective of this program is to gather environmental baseline data to support environmental assessment of the Izok Project and to provide the information needed to develop a Project Proposal and Environmental Impact Statement for review by the Nunavut Impact Review Board.

OBJECTIVES:

The purpose of collecting wildlife baseline data is twofold:

To meet the environmental assessment requirements for a description of the biological environment. The results of our studies will include information on the presence, relative abundance, habitat use, and distribution of wildlife species, in addition to locations of observed habitat features such as dens and nest sites.

To provide the information needed to develop a Project Proposal and Environmental Impact Statement for review by the Nunavut Impact Review Board.

METHODS:

Methodologies will vary with each species, as described in detail below. The majority of the survey work will not involve direct capture or handling of wildlife.

Ungulates: surveys will be conducted using systematic, aerial transect surveys. Data collected may be used to model distribution, abundance, and composition of ungulates within the study area.

Large carnivores: carnivore locations and den sightings will be recorded during all fieldwork and wildlife surveys. Hair and/or scat samples may be collected to determine species use of dens. Data collected will be used to identify carnivore presence, abundance, and denning locations within the study area.

Wolverine: DNA based mark recapture study is anticipated for April 2008. The intent of the work would be to estimate the number and density of wolverines using a portion of the Izok project study area.

Raptors: aerial raptor surveys will be completed to document distribution and baseline productivity of raptor species in the study area.

Waterfowl Surveys for waterfowl in the Regulated Shooting Area (RSA) will be conducted using a method described by Hines et al. (2004) that is widely used to survey waterfowl and other low-density species in the Arctic (Hines and Wiebe 2004).

RESULTS AND MAIN CONCLUSIONS:

Aerial loon and waterfowl surveys: The loon/waterfowl survey was conducted from a helicopter equipped with floats. Occurrences of waterfowl were documented, as well as any other incidental wildlife species observed, including raptors and other large birds. A total of eight species of loons/ waterfowl and two species of gulls/terns were recorded.

Raptor surveys and productivity: Raptor surveys and productivity were conducted via helicopter. All nest sites were marked with a hand held GPS (GPS Map 76) with raptor species, nest type, number of adults and eggs or chicks, aspect, overhang, cliff height and nest height recorded on data forms. Photos were taken of selected sites.

Ungulate surveys: Timing of the programs was selected based on migratory patterns. The surveys extended into the NWT from May to September 2008.

May survey: Approximately 1040 caribou and two groups of muskoxen (42, 13) were observed and recorded during the survey. Caribou were generally seen on the southern and eastern portion of the RSA, close to the Lupin mine.

June survey: Approximately 409 caribou with 44 calves, 172 muskoxen with 17 calves, 167 seals, 3 moose, 3 bears, 3 wolves and one swan were observed and recorded during the survey. Nursery groups of caribou were generally seen southeast of Ulu. Bull caribou groups were located mostly to the southwest of the Izok area but also in the Jericho / Lupin area.

August survey: 482 Bathurst caribou were observed, primarily in the vicinity of Lupin and up to half way towards Izok. Only three caribou were observed on the 16 transects between Jericho and Ulu. Relatively few calves were observed and most groups were <6 animals (with the exception on one group of 125 caribou on the east side of Contwoyto Lake). Thirty-two muskoxen were also observed. Incidental observations during the ungulate survey included four wolves (a single on a caribou kill, and a group of three), and a female grizzly bear with two yearlings.

September survey: The ungulate survey was completed using a Turbo Beaver aircraft. Data was not compiled as a result of the survey.

LONG-TERM PLANS AND RECOMMENDATIONS:

We plan to make extensive use of existing data wherever it is available. This will come in the form of published reports from projects such as the West Kitikmeot Slave Study, EMAN-North, other government sources, and other baseline studies. Significant cost and effort has gone into collecting information in areas that may not directly overlap our regional study area, but are located within similar ecological context. Our goal in conducting baseline studies during 2008 is to provide support for extrapolation of information from other sources, where appropriate, and to fill in gaps in information where necessary.

COMMUNITY INVOLVEMENT:

All available traditional knowledge data sources will be examined to acquire information on animal population trends and movement patterns within the study area. Local assistants will be employed for wildlife surveys.

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De Beers Snap Lake Mine: Wildlife Effects Monitoring Program (WEMP)

Period: February 26, 2008 to December 31, 2008

Main Investigator: John Virgl, De Beers Snap Lake Diamond Mine

Wildlife Research Permit Number: WL005657

LOCATION:

All wildlife studies took place within a study area of 31 km radius around the Snap Lake Mine, a total area of 3,109 km^2. These studies occurred at various times from February 26, 2008 to December 31, 2008.

RATIONALE:

The Wildlife Effects Monitoring Program (WEMP) is a requirement of the project's Environmental Agreement (Article VII, 7.2c) and Land Use Permit (Condition 36).

The annual Snap Lake WEMP was designed to detect, measure, and manage mine related impacts on wildlife habitat, wildlife presence, behaviour and distribution, and wildlife injuries and mortalities. The WEMP is intended to provide information for the mine's environmental management system (EMS), to adaptively manage the mine, to protect wildlife and wildlife habitat, and to contribute to regional monitoring information that may then be used to assess cumulative effects of mining on wildlife.

OBJECTIVES:

To determine annual variability in the following species indicator variables (endpoints) within the study area:

The density, distribution, group composition and behaviour of caribou;

The relative activity (presence) and distribution of grizzly and black bears;

The relative activity (presence) and distribution of wolverines;

The presence, distribution and production of wolves (not part of the WEMP, data is provided to ENR); and

The distribution, nest occupancy, nest success and production of raptors.

METHODS:

A summary of the methods used and approximate dates are provided below. Further details on methods can be found in the annual Wildlife Effects Monitoring Program reports, the Snap Lake Wildlife Monitoring Plan, and the Snap Lake Wildlife Management Plan.

Four aerial surveys were flown between May 6 and October 17. Data gathered is used to monitor caribou abundance, distribution, group composition, and behaviour within the study area.

Bear activity was documented by ground surveys for fresh bear sign in pre-selected plots located in preferred grizzly bear habitat. Thirty plots were surveyed in the spring (June) and forty plots were surveyed in the summer (August).

A wolverine snow track survey was completed in March to document wolverine activity and distribution in the study area. The wolverine survey included 50 transects, 4 km in length, distributed throughout the study area. The survey was completed by two observers, each on snow machines.

A helicopter survey for raptor nests and wolf dens was completed in early June and mid-July to determine occupancy and productivity of identified nest and den sites.

Interactions with wildlife on site are documented and managed by the De Beers environmental staff, and this information is reported in the annual Wildlife Effects Monitoring Program report.

RESULTS AND MAIN CONCLUSIONS:

Results of the 2008 WEMP will be presented in the 2009 annual Wildlife Effects Monitoring Report. Although there continues to be interactions with wildlife on site, there have been no caribou, wolf, grizzly bear, black bear or wolverine mortalities at the Snap Lake Mine.

LONG-TERM PLANS AND RECOMMENDATIONS:

Wildlife monitoring will continue during the entire operational period of the Snap Lake Mine, as per the Snap Lake Mine Wildlife Effects Monitoring Plan.

COMMUNITY INVOLVEMENT:

Community feedback on the WEMP has been provided through the Snap Lake Environmental Monitoring Agency (SLEMA). Community involvement in the field studies included an aerial caribou survey with community elders (Grant Beck and Alfred Bellaergeron). Pete Enzoe of Lutsel K'e was involved in wolverine track surveys and grizzly bear sign surveys.

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Baseline Wildlife Studies for the Taltson Expansion Project

Period: May 2008 to October 2008

Main Investigator: Damian Panayi, Golder Associates Ltd.

Wildlife Research Permit Number: WL005608

LOCATION:

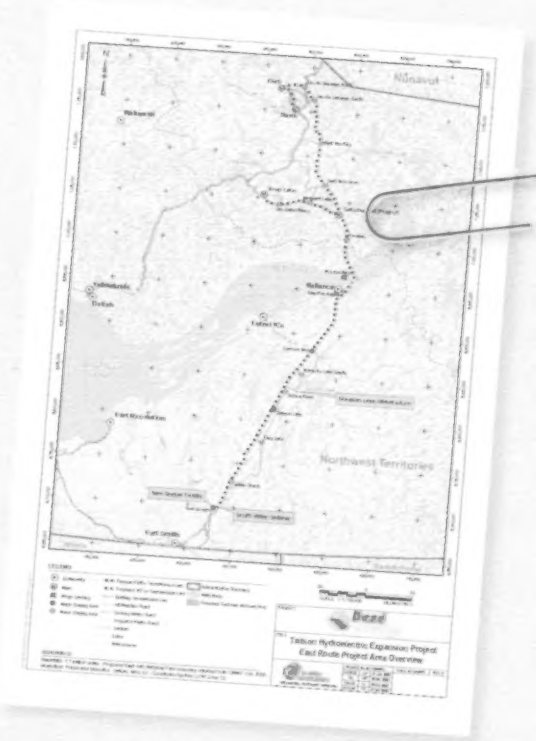
The studies were conducted along the transmission line corridor of the Taltson Hydroelectric Expansion Project, predominantly within the forested regions.

RATIONALE:

The studies were conducted to document existing environmental conditions, to assess project effects and suggest mitigation strategies.

OBJECTIVES:

The studies focussed on four areas of interest: wetlands within the Taltson River basin, the presence of yellow rail and northern leopard frog within the Taltson River basin, the abundance and species composition of waterfowl in the vicinity of the transmission line route, and the presence of sensitive wildlife features along the transmission line route (including rivers, streams, cliffs and caribou trails).



METHODS:

Wetlands were mapped and classified through the use of aerial photographs, satellite imagery, and ground surveys. Yellow rail surveys were conducted using call-playbacks during the courtship and pre-egg laying period, as per protocols suggested by the Canadian Wildlife Service. Surveys for northern leopard frogs were conducted after the June breeding period, and included searches for evidence of breeding (i.e., egg masses, tadpoles, and emerging juvenile toads) and presence of adults. Sensitive environmental features such as cliffs, stream crossings, wetlands and caribou trails were mapped during aerial surveys by helicopter of the transmission line route.

Surveys for breeding waterfowl were completed along the portion of the proposed transmission line found in the boreal forest. Two surveys were conducted to capture both early and late arriving waterfowl (in late May and mid June). A random selection of lakes within 1 km of the proposed transmission line route were surveyed for waterfowl by helicopter, as per protocol established for boreal forest breeding waterfowl by Ducks Unlimited Canada.

RESULTS AND MAIN CONCLUSIONS:

Through the surveys, it was concluded that waterfowl are present in low densities along the transmission line route, that yellow rail are not present within the Taltson River basin, and that there are existing and potential raptor nests along the transmission line route. Cliffs, rivers, streams, lakes, wetlands, incidental observations of wildlife, and caribou trails were also recorded. The findings of the baseline studies were provided in the *Taltson Expansion Project Developer's Assessment Report*, submitted to the Mackenzie Valley Review Board in 2009 (see Review Board file EA0708-007).

LONG-TERM PLANS AND RECOMMENDATIONS:

Should the Taltson Expansion Project proceed, a Wildlife Mitigation and Monitoring Plan will be developed with the input of communities and government agencies.

PARTNERS:

Dezé Energy Corporation

COMMUNITY INVOLVEMENT:

The surveys were conducted in part due to concerns raised by communities during the project scoping sessions, conducted by the Mackenzie Valley Land and Water Board, and by the Mackenzie Valley Review Board. Substantial changes to the project have been made in response to public concern raised during consultations and public hearings.

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Quantifying Bird and Mammal Response to Human Land-Use Practices in the Northwest Territories

Period: May 30, 2008 to August 31, 2008

Main Investigator: Dr. Erin Bayne, Associate Professor, Biological Sciences University of Alberta

Wildlife Research Permit Number: WL005606

LOCATION:

Field work has been conducted in and around the communities of Fort Liard, Fort Simpson, Jean Marie River, Fort Providence, Kakisa, and Trout Lake. Work has also occurred along the Liard and Mackenzie Rivers and highways between the aforementioned communities.

RATIONALE:

Demand for natural resources has spurred increased resource development and extraction activities across northwestern Canada. In the Northwest Territories much of this activity is occurring in ecologically intact locations. While many residents welcome the opportunity for economic growth associated with resource development, there is also concern around how such land uses may impact ecosystems and wildlife populations. To make informed management decisions, it is important to understand how animal species respond to and may be impacted by different human land use disturbances. With this information it will be possible to objectively evaluate the trade-off and consequences of different development and management trajectories.

OBJECTIVES:

To determine if birds and mammals (specifically marten and black bear) preferentially use, avoid, or show no response to landscape disturbances like pipelines and seismic lines;

To determine if observed animal responses are dependent on disturbance type, surrounding habitat type, disturbance intensity (physical space occupied by disturbance), or disturbance age; and

To create models predicting the consequences different development trajectories will have on boreal birds and mammals in southwestern Northwest Territories.

METHODS:

Birds: Point counts are being used to compare species richness and evenness between seismic lines and control plots in upland and lowland habitat types. A sub-sample of birds have been captured, banded and spot mapped to determine territory size and shape relative to seismic lines of different ages and widths.

Mammals: Infrared cameras, track tubes, and pellet counts are being used to compare mammal use or avoidance of seismic lines and control locations in a variety of habitat types.

Detailed vegetation surveys will be conducted at all point count and mammal sampling points.

RESULTS AND MAIN CONCLUSIONS:

Birds: One hundred and forty six point counts were conducted and a total of 54 passerine species were detected in conifer, mixed wood, and deciduous forests combined. Seismic lines in the NT resulted in increased use by American redstarts, American robin, black and white warbler, dark-eyed junco, gray jays, least flycatchers, Tennessee warblers, and white-crowned sparrows. The western tanager was more likely to be in the forest interior. In all cases except the American redstart, the increase observed disappeared as the lines became overgrown. Significant differences were found in relation to seismic lines and forest interiors in the Fort Liard region. This work is ongoing and will be complete by 2011.

Mammals: A total of 330 cameras were deployed with images of nine species being captured, including marten, black bear, lynx, moose, caribou, red squirrel, snowshoe hare, sandhill crane, and gray jay. Marten detection was significantly more likely on closed lines and in forest interiors on open lines. Semi-open lines were intermediate but the difference from other groups was not statistically significant. In contrast, bears were detected significantly more frequently on open and semi-open lines than on closed lines or in forest interiors. The probability of detecting a marten on a seismic line increased with an increase in the number of stems of deciduous shrub species as a total stem count. The persistence of game trails on lines as they regenerate may have more of an influence on line use by bears than the specific vegetation attributes we measured in 2008.

LONG-TERM PLANS AND RECOMMENDATIONS:

We intend to conduct at least one more field season to collect additional data. Work in the coming year will be focused on several research aspects in particular.

Birds: Our focus for 2009 forest songbirds work will be to increase our sample size of mapped ovenbird territories, to survey individual birds in lowland habitats to understand the mechanism behind the population trends observed in lowland black spruce forests, and increase the sample size of point counts conducted in black spruce habitat.

Mammals: Based on our findings from 2008, we intend to focus on 3 areas in 2009. First we will sample narrower seismic lines, specifically 4-5 m width lines and 2-3 m wide lines. We are interested in whether the above patterns persist for narrower lines, or if these lines don't have an impact for mammals. Second, we will sample across a wide range of total seismic density. Third, we will employ refined methodology to measure mammal response to line types and density using pellet counts.

PARTNERS:

University of Alberta

Environment and Natural Resources

Environment Canada, Canadian Wildlife Service

Paramount Resources, Ltd.

Petroleum Technology Alliance Canada

Environmental Studies Recovery Fund

COMMUNITY INVOLVEMENT:

Local community members were consulted to better understand (a) which parts of the study site are currently being trapped, (b) where local animal densities are highest and lowest, and (c) how trapping and other traditional land uses may have changed as a result of increasing industrial land use.

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